HP Pavilion Notebook (Intel)

Maintenance and Service Guide

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Product notice

This guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available on all editions of Windows 8.1. This computer may require upgraded and/or separately purchased hardware, drivers, and/or software to take full advantage of Windows 8.1 functionality. See http://www.microsoft.com for details.

Safety warning notice

⚠ **WARNING!** To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The device and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950-1).

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1 Product description

Category	Description
Product name	HP Pavilion Notebook
Processors	**5th generation Intel® Core™ i7 Processor** Intel Core i7-5500U (2.4GHz, SC turbo up to 3.0GHz), 1600MHz/4MB L3, Dual 15W (models with discrete graphics only) **5th generation Intel Core i5 Processor** Intel Core i5-5200U (2.2GHz, SC turbo up to 2.7GHz), 1600MHz/3MB L3, Dual 15W **5th generation Intel Core i3 Processor** Intel Core i3-5010U (2.0GHz), 1600MHz/3MB L3, Dual 15W **Intel Braswell (BGA)** Intel Pentium N3700 (1.60GHz, turbo up to 2.40GHz), 1600MHz/2MB L2, Quad 6W
Chipset	Intel BDW U / Y / H processor 1-chip BGA Intel BSW
Graphics	**Internal graphics:** Intel HD Graphics 5500 Intel HD Graphics
	Switchable discrete graphics: NVIDIA N16S-GT (GeForce 940M) with up to 2048 MB or 4096 MB of dedicated video memory (256Mx16 DDR3 900MHz x 4 PCs, 1GHz bridge to 900MHz) (i5/i7 processors) AMD R7 M360 (Meso-XT) with up to 2048 MB of dedicated video memory (256Mx16 DDR3 900MHz x 4 PCs, 1GHz bridge to 900MHz) (i5/i7 processors) Support HD Decode, DX11, and HDMI
Panel	**39.6-cm** (15.6-in), high-definition (HD), white light-emitting diode (WLED), SVA, BrightView (1366×768) display, flat 3.8 mm, eDP; typical brightness: 220 nits **39.6-cm** (15.6-in), HD, WLED, SVA, BrightView, (1366×768) display, slim 3.2 mm, TOP (Touch On Panel); typical brightness: 200 nits **39.6-cm** (15.6-in), FHD, WLED, SVA, AntiGlare, (1920×1080) display, slim 3.2 mm; typical brightness: 220 nits Touch screen with flush glass, multi-touch enabled Supports LVDS (co-layout with eDP1.2)
Memory	**Two SODIMM slots - NON customer accessible / upgradeable** DDR3L-1600 Dual Channel Support Supports up to 16 GB of system RAM in the following configurations: • 16384-MB total system memory (8192×2) • 12288-MB total system memory (8192×1) + (4096×1) • 8192-MB total system memory (8192×1) or (4096×2)

Category	Description
	• 6144-MB total system memory (4096×1) + (2048×1) • 4096-MB total system memory (4096×1) or (2048×2)
Hard drives	Supports **6.35-cm** (2.5-in) SATA hard drives in **9.5 mm** (.37 in) and **7.0 mm** (.28 in) thicknesses 7 mm/9.5 mm share the same bracket Accelerometer / HDD protection support **Single HDD configurations:** • 2-TB, 5400-rpm, 9.5-mm • 1-TB, 5400-rpm, 9.5-mm • 750-GB, 5400-rpm, 9.5-mm • 500-GB, 5400-rpm, 9.5-mm or 7.0-mm **Hybrid HDD configurations:** • 1-TB, 5400-rpm, 9.5-mm SSHD w/8GB NAND • 500-GB, 5400-rpm, 7.0-mm SSHD w/8GB NAND
Optical drive	Fixed, serial ATA, 9.5-mm tray load Blu-ray Disc R/RW with SuperMulti (models with discrete graphics only) DVD+/-RW Double-Layer SuperMulti Supports zero power optical drive Supports M-disc
Audio/video	HP TrueVision HD: HD camera (fixed, no tilt with activity LED, 1280×720 by 30 frames per second) Dual array digital microphone with appropriate software - beam forming, echo cancellation, noise suppression Dual speakers Enable HP Noise Cancellation HD audio B&O Play
Sensors	Accelerometer
Ethernet	Integrated 10/100 network interface card (NIC)
Wireless	Intel WiDi support Compatible with Miracast-certified devices **Integrated Wireless options with single antenna (M.2/PCIe):** • Broadcom BCM43142 802.11 b/g/n 1x1 Wi-Fi + BT4.0 M.2 Combo Adapter • Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + BT4.0 Combo Adapter • Realtek RTL8188EE 802.11b/g/n 1x1 Wi-Fi Adapter • Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + BT4.0 Combo Adapter **Integrated Wireless options with dual antenna (M.2/PCIe):** • Intel Dual Band Wireless-AC 3160 802.11 ac 1x1 WiFi + BT 4.0 Combo Adapter
Internal card expansion	One M.2 slot for WLAN

Category	Description
External media card	HP Multi-Format Digital Media Card Reader Support SD/SDHC/SDXC Push-Push Insertion/Removal SIM slot (populated with WWAN; tool-less user-accessible)
Ports	HDMI version 1.4 supporting 1920 ×1200 @ 60Hz Hot Plug/unplug and auto detect for correct output to wide-aspect vs. standard aspect video RJ-45 (Ethernet, includes link and activity lights) USB 3.0 (1 on left side, one on right side) USB 2.0 (1 on left side) AC Smart Pin adapter plug Headphone jack Microphone jack
Keyboard/ pointing devices	Full size standard textured island-style keyboard with numeric keypad Full size standard three coat paint island-style backlit keyboard with numeric keypad ClickPad with multi-touch gestures, 2-finger scrolling, and pinch-zoom enabled Taps enabled by default Support Win8 Modern Trackpad Gestures
Power requirements	**Battery:** 4-cell, 41-Whr, 2.8Ah, li-ion battery **AC adapters:** AC Adapter 65-W Smart nPFC, 3 pin, RC 4.5mm connector (models with discrete graphics only) AC Adapter 65-W EM Smart nPFC, 3 pin, RC 4.5mm connector (models with discrete or UMA graphics in India/China only) AC Adapter 45-W Smart nPFC, 3 pin, RC 4.5mm connector (models with UMA graphics only) 1 meter power cord
Security	Kensington Security Lock Trusted Platform Module (TPM) 2.0
Operating system	**Preinstalled:** • Windows 8.1 • Windows 8.1 CPPP - China only • Windows 7 Professional (32- and 64-bit) (models with UMA graphics only)
Serviceability	**End-user replaceable parts:** • AC adapter • Battery • Optical drive

2 External component identification

Display

NOTE: Refer to the illustration that most closely matches your computer.

Component		Description
(1)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on. **NOTE:** The internal display switch is not visible from the outside of the computer.
(2)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(3)	Internal microphones (2)	Record sound.
(4)	Webcam light	On: The webcam is in use.
(5)	Webcam – or – 3D camera (select models only)	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video. To use the webcam or 3D camera in Windows 8.1: ▲ From the Start screen, type `camera`, and then select **Camera** from the list of applications. To use the webcam in Windows 7: ▲ Select **Start > All Programs > Communication and Chat > CyberLink YouCam**.

Component	Description
	NOTE: In Windows 8.1, a 3D camera captures 3D images and displays them on the computer screen. It includes additional hardware (a 3D camera sensor and a 3D laser projector) plus special software. To learn more about using a 3D camera, open the Intel RealSense app **Welcome to Intel RealSense**. To access the 3D camera apps, go to the **Intel RealSense Technology** app.

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

To access this document from Windows 8.1:

From the Start screen, type `support`, and then select the **HP Support Assistant** app.

– or –

From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

To access this document from Windows 7, select **Start > HP Support Assistant > Next > My computer > User Guides**.

Component		Description
(1)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on. **NOTE:** The internal display switch is not visible from the outside of the computer.
(2)	Internal microphones (2)	Record sound.
(3)	Webcam light	On: The webcam is in use.
(4)	Webcam – or – 	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video. To use the webcam or 3D camera in Windows 8.1:

Component		Description
	3D camera (select models only)	▲ From the Start screen, type `camera`, and then select **Camera** from the list of applications. To use the webcam in Windows 7: ▲ Select **Start > All Programs > Communication and Chat > CyberLink YouCam**. **NOTE:** In Windows 8.1, a 3D camera captures 3D images and displays them on the computer screen. It includes additional hardware (a 3D camera sensor and a 3D laser projector) plus special software. To learn more about using a 3D camera, open the Intel RealSense app **Welcome to Intel RealSense**. To access the 3D camera apps, go to the **Intel RealSense Technology** app.
(5)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

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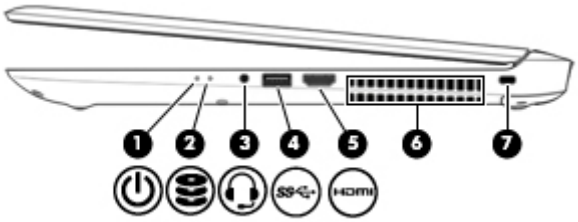
From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

To access this document from Windows 7, select **Start > HP Support Assistant > Next > My computer > User Guides**.

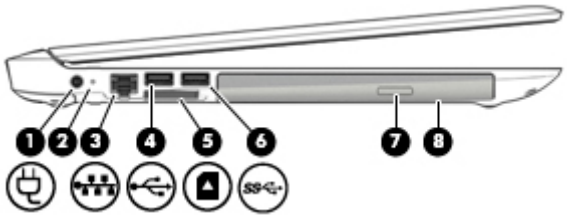
Right side



Component			Description
(1)		Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other components. • Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)		Drive light	• Blinking white: The hard drive or optical drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(3)		Audio-out (headphone)/Audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional microphone-only devices. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*. To access this document in Windows 8.1: ▲ From the Start screen, type `support`, and then select the **HP Support Assistant** app. – or – From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar. To access this document from Windows 7, select **Start > HP Support Assistant > Next > My computer > User Guides**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled. **NOTE:** Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(4)		USB 3.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(5)		HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.
(6)		Vent	Enables airflow to cool internal components.

		NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(7)	Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Left side

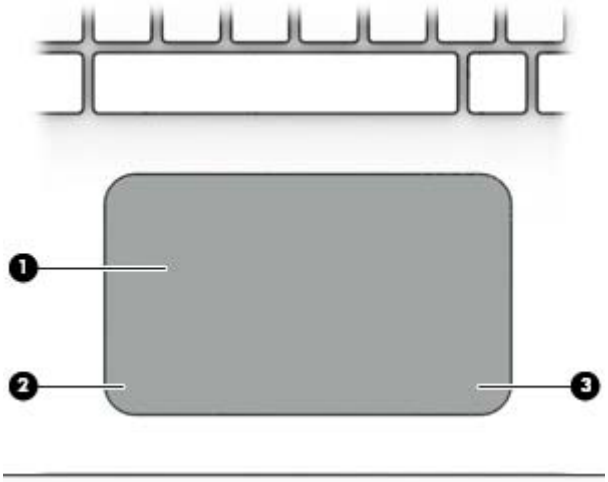


Component		Description
(1)	Power connector	Connects an AC adapter.
(2)	AC adapter/battery light	• White: The AC adapter is connected and the battery is fully charged. • Blinking white: The AC adapter is disconnected and the battery has reached a low battery level. • Amber: The AC adapter is connected and the battery is charging. • Off: The battery is not charging.
(3)	RJ-45 (network) jack/status lights	Connects a network cable. • White: The network is connected. • Amber: Activity is occurring on the network.
(4)	USB 2.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(5)	Memory card reader	Reads optional memory cards that enable you to store, manage, share or access information. To insert a card: ▲ Hold the card label-side up, with connectors facing the slot, insert the card into the slot, and then push in on the card until it is firmly seated. To remove a card: ▲ Press in on the card it until it pops out.
(6)	USB 3.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.

Component		Description
(7)	Optical drive eject button	Releases the disc tray.
(8)	Optical drive	Depending on your computer model, reads an optical disc or reads and writes to an optical disc. **NOTE:** For disc compatibility information, go to the Help and Support web page. Follow the web page instructions to select your computer model. Select **Drivers & Downloads**, and then follow the on-screen instructions.

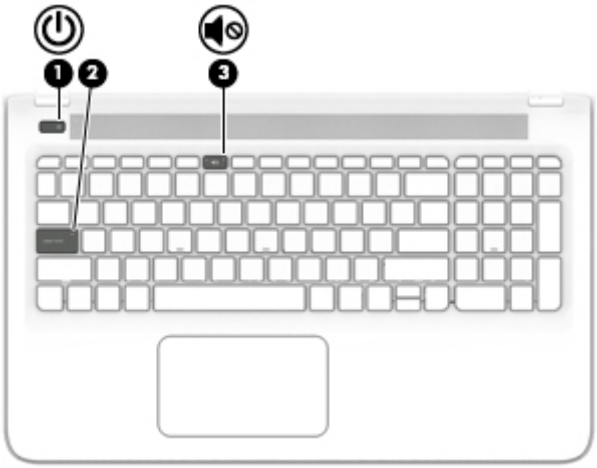
Top

TouchPad



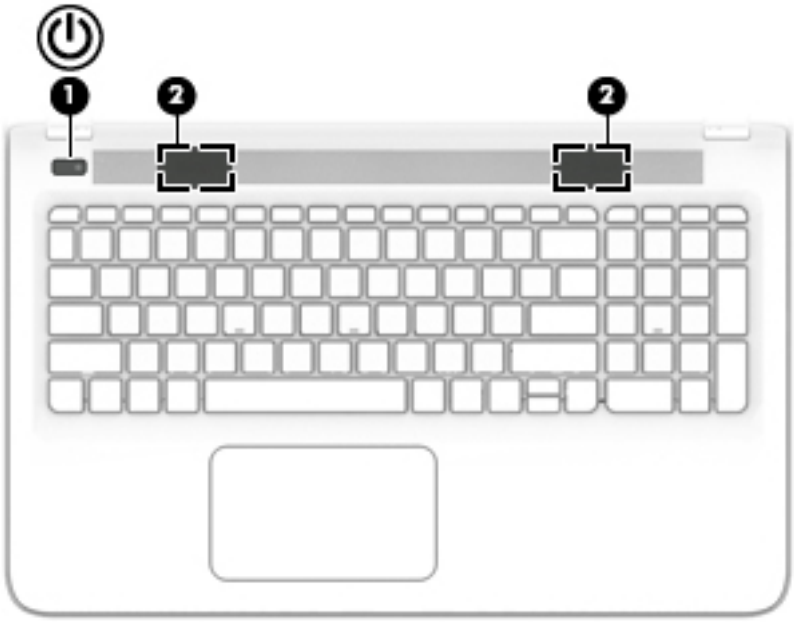
Component		Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.

Lights



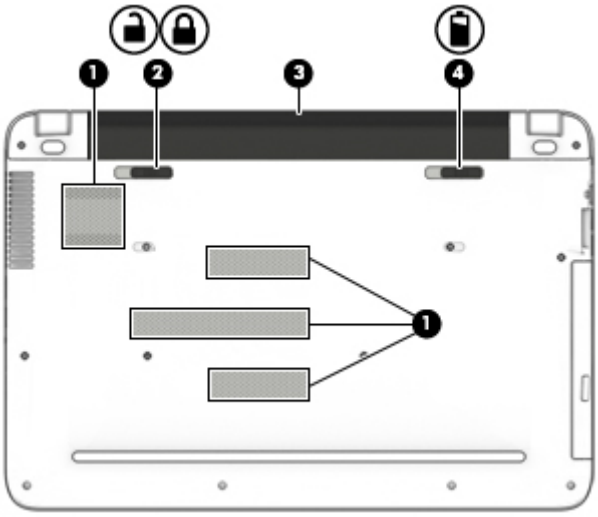
Component		Description
(1)	Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. • Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)	Caps lock light	White: Caps lock is on, which switches the keys to all capital letters.
(3)	Mute light	• Amber: Computer sound is off. • Off: Computer sound is on.

Buttons and speakers



Component			Description
(1)		Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button briefly to initiate Sleep. • When the computer is in the Sleep state, press the button briefly to exit Sleep. • When the computer is in Hibernation, press the button briefly to exit Hibernation. **CAUTION:** Pressing and holding down the power button will result in the loss of unsaved information. If the computer has stopped responding and Windows shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer. To learn more about your power settings in Windows 8.1, see your power options. ▲ From the Start screen, type `power`, select **Power and sleep settings**, and then select **Power and sleep** from the list of applications. – or – From the Windows desktop, right-click the **Start** button, and then select **Power Options**. To learn more about your power settings, select **Start > Control Panel > System and Security > Power Options**.
(2)		Speakers (2)	Produce sound.

Bottom



Component			Description
(1)		Vents (4)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)		Battery lock	Locks the battery in the battery bay.
(3)		Battery bay	Holds the battery.
(4)		Battery release latch	Releases the battery.

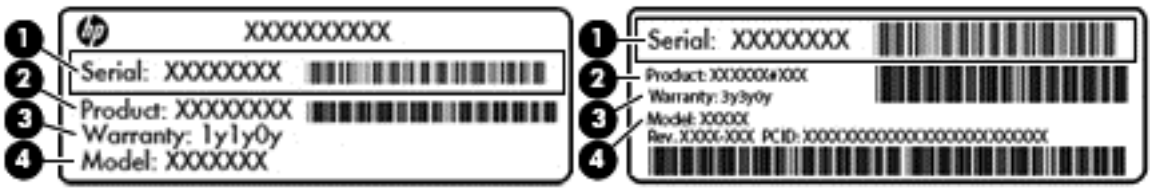
Labels

The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer.

IMPORTANT: Check the following locations for the labels described in this section: the bottom of the computer, inside the battery bay, or on the back of the display.

- Service label—Provides important information to identify your computer. When contacting support, you will probably be asked for the serial number, and possibly for the product number or the model number. Locate these numbers before you contact support.

  Your service label will resemble one of the examples shown below. Refer to the illustration that most closely matches the service label on your computer.



Component	
(1)	Serial number
(2)	Product number
(3)	Warranty period
(4)	Model number (select models only)

- Microsoft® Certificate of Authenticity label (select models only prior to Windows 8)—Contains the Windows Product Key. You may need the Product Key to update or troubleshoot the operating system. HP platforms with Windows 8 or Windows 8.x preinstalled do not have the physical label. Instead a Digital Product Key is electronically installed.

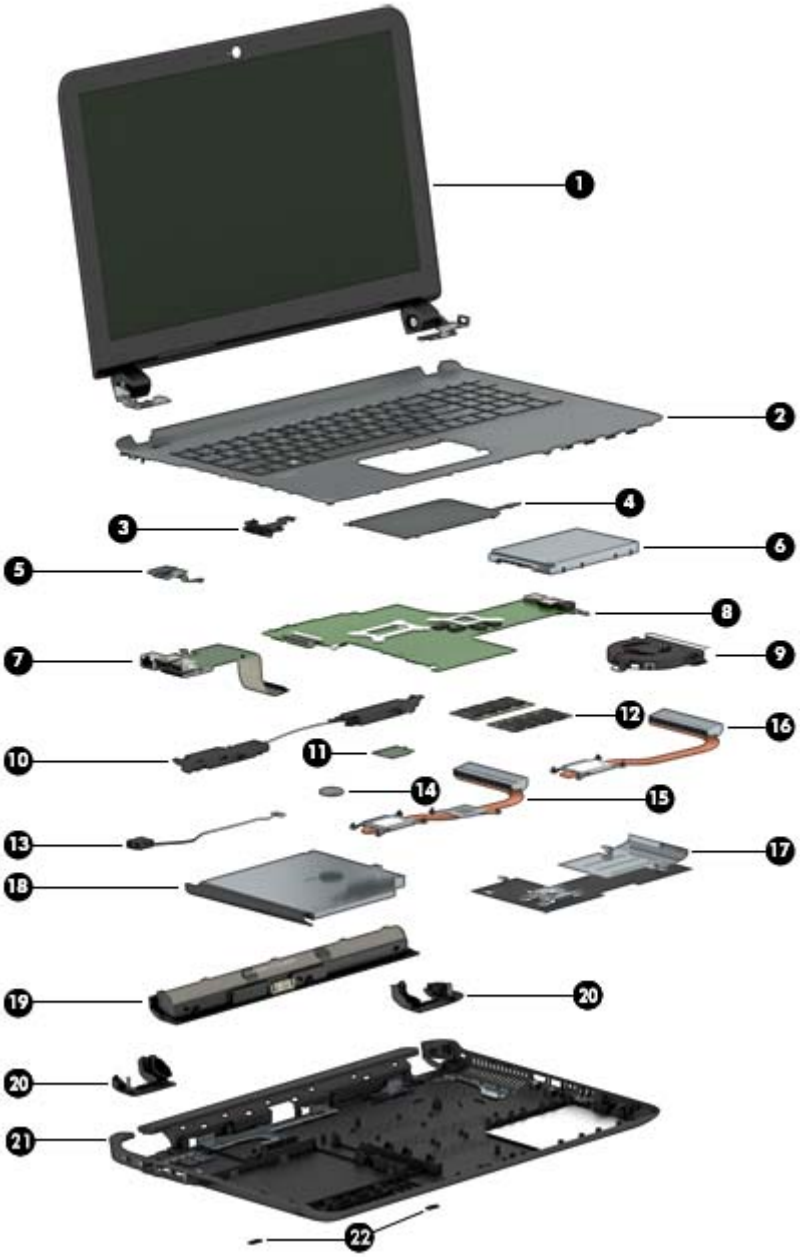
  NOTE: The Digital Product Key is automatically recognized and activated by Microsoft operating systems when a Windows 8 or Windows 8.x operating system is reinstalled using HP-approved recovery methods.

- Regulatory label(s)—Provide(s) regulatory information about the computer.
- Wireless certification label(s)—Provide(s) information about optional wireless devices and the approval markings for the countries or regions in which the devices have been approved for use.

3 Illustrated parts catalog

Computer major components

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.



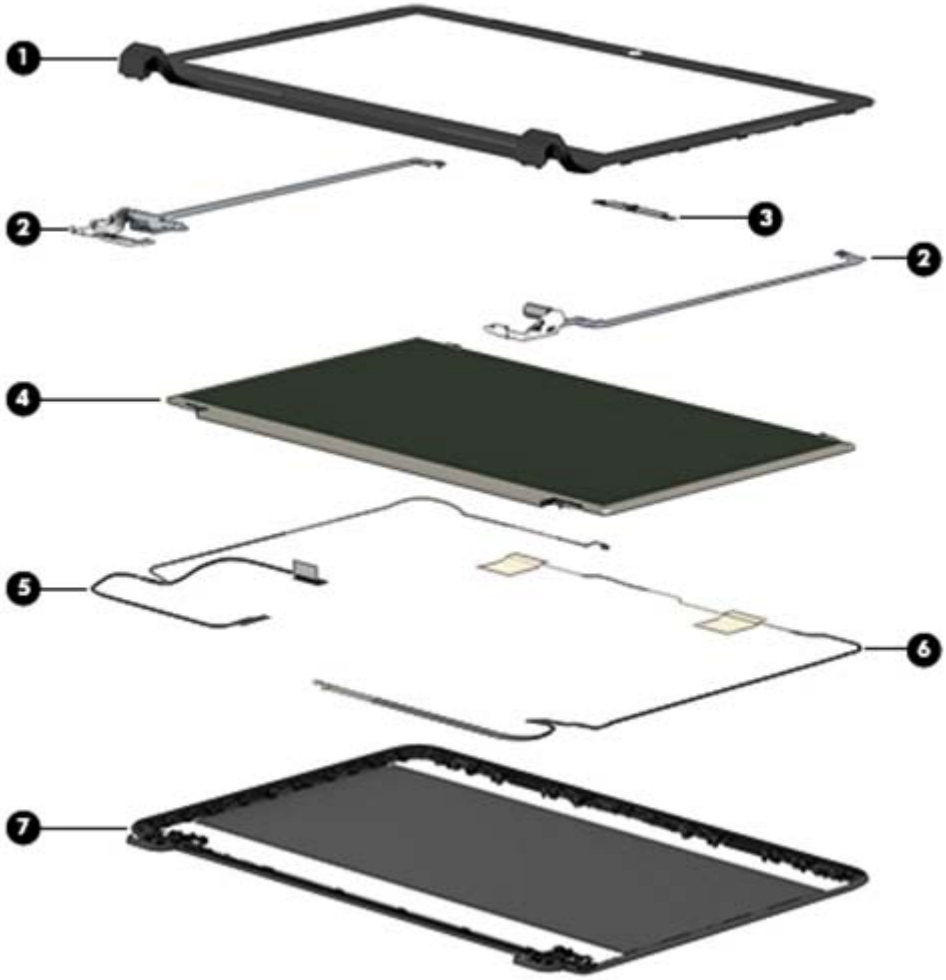
Item	Component	Spare part number
(1)	**Display assembly** (39.6-cm [15.6-in] HD, touch screen) **NOTE:** Touch displays are spared both as entire hinge-ups and at the subcomponent level. Non-touch displays are only spared at the subcomponent level. **NOTE:** For display assembly spare part information, see Display assembly subcomponents, non-touch models on page 19 and Display assembly subcomponents, touch models on page 21.	not spared
(2)	**Top cover/keyboard** (includes touchpad)	
	Models without a backlight:	
	• For use in Belgium	809031-A41
	• For use in Brazil	809031-201
	• For use in Bulgaria	809031-261
	• For use in the Czech Republic and Slovakia	809031-FL1
	• For use in Denmark, Finland, and Norway	809031-DH1
	• For use in French Canada	809031-DB1
	• For use in France	809031-051
	• For use in Germany	809031-041
	• For use in Greece	809031-151
	• For use in Hungary	809031-211
	• For use in Israel	809031-BB1
	• For use in Italy	809031-061
	• For use in Japan	809031-291
	• For use in Latin America	809031-161
	• For use in the Netherlands	809031-B31
	• For use in Portugal	809031-131
	• For use in Romania	809031-271
	• For use in Russia	809031-251
	• For use in Saudi Arabia	809031-171
	• For use in Spain	809031-071
	• For use in Slovenia	809031-BA1
	• For use in South Korea	809031-AD1
	• For use in Switzerland	809031-BG1
	• For use in Taiwan	809031-AB1
	• For use in Thailand	809031-281
	• For use in Turkey	809031-141
	• For use in the United Kingdom	809031-031

Item	Component	Spare part number
	• For use in the United States	809031-001
	Models with a backlight:	
	• For use in French Canada	809032-DB1
	• For use in Saudi Arabia	809032-171
	• For use in Turkey	809032-141
	• For use in the United States	809032-001
(3)	**Optical Drive Cable Kit**	811199-001
(4)	**Touchpad**	813987-001
(5)	**Power button board** (includes cable)	809033-001
(6)	**Hard drive** (does not include bracket): **NOTE:** The hard drive bracket and connector are available using spare part number 809296-001.	
	2-TB, 5400-rpm, 2.5-inch	801808-005
	1-TB, 5400-rpm, 2.5-inch, hybrid 8 GB SSD	731999-005
	1-TB, 5400-rpm, 2.5-inch	778192-005
	750 GB, 5400 rpm hard drive, 2.5 inch	778190-005
	500-GB, 5400-rpm, 7 mm, hybrid 8 GB SSD	732000-005
	500-GB, 5400-rpm, 2.5 inch	778188-005
(7)	**USB board** (includes cable)	
	For use in models with Intel Core processors	809038-001
	For use in models with Intel Pentium processors	820000-001
(8)	**System board** (includes replacement thermal materials): All system boards use the following part numbers: xxxxxx-001: Without the Windows operating system xxxxxx-501: Windows 8.1 Standard xxxxxx-601: Windows 8.1 Professional	
	For use in models with discrete graphics (NVIDIA N16S-GT (GeForce 940M)):	
	• Intel Core i7-5500U processor and 2 GB of dedicated video memory	809045-xxx
	• Intel Core i7-5200U processor and 4 GB of dedicated video memory	809046-xxx
	• Intel Core i7-5200U processor and 2 GB of dedicated video memory	809044-xxx
	For use in models with discrete graphics (AMD R7 M360 (Meso-XT)):	
	• Intel Core i5-5200U processor and 2 GB of dedicated video memory	809043-xxx
	• Intel Core i3-5010U processor and 2 GB of dedicated video memory	809042-xxx
	For use in models with UMA graphics	
	• Intel Core i7-5500U processor	819972-xxx

Item	Component	Spare part number
	• Intel Core i5-5200U processor	809041-xxx
	• Intel Core i3-5010U processor	809040-xxx
	• Intel Pentium N3700 processor	817867-xxx
(9)	**Fan**	806747-001
(10)	**Speakers** (includes left and right speakers and cable)	809037-001
(11)	**WLAN module:**	
	Intel Dual Band Wireless-AC 3160 802.11ac 1×1 WiFi + BT 4.0 Combo Adapter	710662-205
	Intel Dual Band Wireless-AC 7265 802.11 ac 2x2 WiFi + BT 4.0 Combo Adapter (non vPRO)	784644-005
	Realtek RTL8188EE 802.11b/g/n 1x1 Wi-Fi Adapter	792609-005
	Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + BT4.0 Combo Adapter	792610-005
(12)	**Memory module** (DDR3L-1600):	
	8-GB	693374-005
	4 GB	691740-005
	2 GB	691739-005
(13)	**Power connector cable**	806746-001
(14)	**RTC battery**	811080-001
	Heat sink assembly (includes replacement thermal materials):	
(15)	For use in models with discrete graphics	806827-001
(16)	For use in models with UMA graphics and Intel Core processors	806826-001
(17)	For use in models with UMA graphics and Intel Pentium and Celeron processors	809106-001
(18)	**DVD+/-RW Double-Layer SuperMulti Drive**	
	For use in silver models	809328-001
	For use in white models	809329-001
	For use in red models	809330-001
	For use in blue models	809331-001
	For use in pink models	809332-001
	For use in purple models	809333-001
	For use in black models	812889-001
	Blu-ray Disc R/RW with SuperMulti Drive	
	For use in silver models	809334-001
(19)	**Battery** (4-cell, 41-Whr, 2.8-Ah Li-ion)	800049-001
(20)	**Base enclosure hinge caps** (left and right)	809034-001
(21)	**Bottom cover**	
	For use in purple models	809026-001

Item	Component	Spare part number
	For use in sparkling black models	809345-001
	For use in red models	809023-001
	For use in white models	809022-001
	For use in blue models	809024-001
	For use in silver models	809021-001
	For use in pink models	809025-001
(22)	**Rubber screw covers**	809035-001

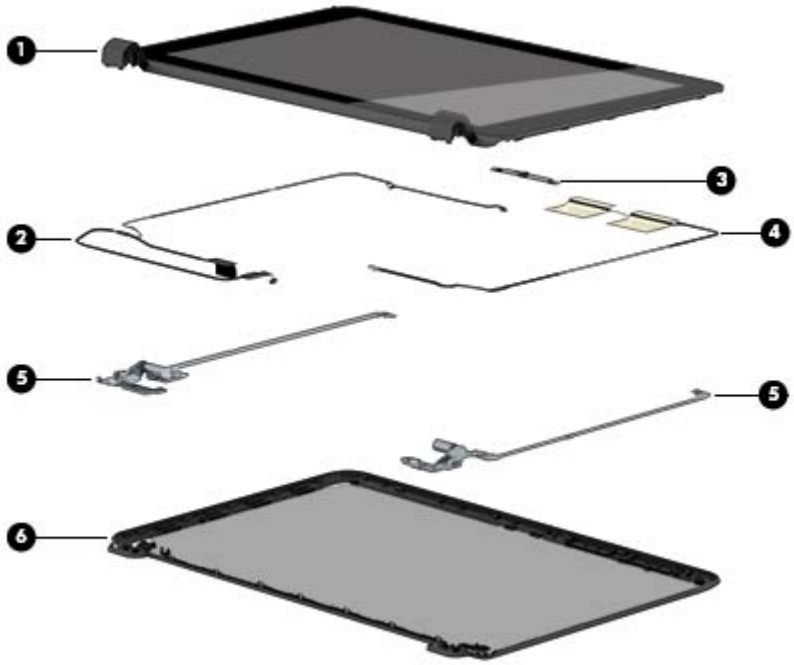
Display assembly subcomponents, non-touch models



Item	Component	Spare part number
(1)	**Display bezel** (includes Mylar screw covers)	809027-001
(2)	**Hinges** (left and right, includes Mylar screw covers)	809030-001

Item	Component	Spare part number
(3)	**Webcam/microphone module**	806758-001
(4)	**Raw display panel** (39.6-cm [15.6-in]; includes Mylar screw covers)	
	BrightView, HD, flat	809371-001
	AntiGlare, FHD, slim	809372-001
	TOP (Touch On Panel)	813109-001
(5)	**Display cable** (includes Mylar screw covers)	
	For use in non-touch displays	809028-001
	For use in TOP (Touch On Panel) displays	809342-001
(6)	**Antennas** (includes wireless antenna cables and transceivers; includes Mylar screw covers)	809008-001
(7)	**Display enclosure** (includes Mylar screw covers):	
	For use in non-touch models:	
	• Black models	809343-001
	• Red models	809011-001
	• White models	809010-001
	• Silver models	809009-001
	• Blue models	809012-001
	• Purple models	809014-001
	• Pink models	809013-001
	For use in TOP (touch on panel) models:	
	• Black models	818657-001
	• Red models	818653-001
	• White models	817836-001
	• Silver models	817835-001
	• Blue models	818654-001
	• Purple models	818656-001
	• Pink models	818655-001

Display assembly subcomponents, touch models



Item	Component	Spare part number
(1)	**Display bezel and panel**	809341-001
(2)	**Display cable** (includes Mylar screw covers)	811222-001
(3)	**Webcam/microphone module**	810961-001
(4)	**Antennas** (includes wireless antenna cables and transceivers)	811201-001
(5)	**Hinges** (left and right)	813345-001
(6)	**Display enclosure**:	
	For use in silver models	809015-001
	For use in white models	809016-001
	For use in red models	809017-001
	For use in blue models	809018-001
	For use in pink models	809019-001
	For use in purple models	809020-001
	For use in black models	809344-001

Miscellaneous parts

Component	Spare part number
HP Smart AC adapter:	
65-W non-PFC EM HP Smart AC adapter (for use in the People's Republic of China and India only)	714657-001
AC adapter, 65-W, non-PFC, 4.5 mm	710412-001
45-W non-PFC, non-slim HP Smart AC adapter (for use in all countries and regions except for the People's Republic of China and India)	741727-001
Power cord (3-pin, black, 1.0-m):	
For use in Australia	755530-011
For use in Brazil	755530-202
For use in Denmark	755530-081
For use in Europe, the Middle East, and Africa	755530-021
For use in India	755530-D61
For use in Israel	755530-BB1
For use in Japan	755530-291
For use in North America	755530-001
For use in the People's Republic of China	755530-AA1
For use in South Africa	755530-AR1
For use in South Korea	755530-AD1
For use in Switzerland	755530-111
For use in Taiwan	755530-AB1
For use in Thailand	755530-201
For use in the United Kingdom and Singapore	755530-031
Rubber Kit (includes front and rear feet)	809035-001
Screw Kit	809036-001
HDMI to VGA adapter	701943-001

Mass storage devices

Item	Component	Spare part number
(1)	**Hard drive** (does not include bracket):	
	2-TB, 5400-rpm, 2.5-inch	801808-005
	1-TB, 5400-rpm, 2.5-inch, hybrid 8 GB SSD	731999-005
	1-TB, 5400-rpm, 2.5-in	778192-005
	750-GB, 5400-rpm, 2.5-in	778190-005
	500-GB, 5400-rpm, 7 mm, hybrid 8 GB SSD	732000-005
	500-GB, 5400-rpm, 2.5 inch	778188-005
	Hard drive hardware kit	809296-001
(2a)	Side brackets (left and right)	
(2b)	Connector	
(3)	**DVD+/-RW Double-Layer SuperMulti Drive**	
	For use in silver models	809328-001
	For use in white models	809329-001
	For use in red models	809330-001
	For use in blue models	809331-001
	For use in pink models	809332-001
	For use in purple models	809333-001
	For use in black models	812889-001
	Blu-ray Disc R/RW with SuperMulti Drive	
	For use in silver models	809334-001

4 Removal and replacement procedures preliminary requirements

Tools required

You will need the following tools to complete the removal and replacement procedures:

- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers

Service considerations

The following sections include some of the considerations that you must keep in mind during disassembly and assembly procedures.

NOTE: As you remove each subassembly from the computer, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic parts

CAUTION: Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic parts. Apply pressure only at the points designated in the maintenance instructions.

Cables and connectors

CAUTION: When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Drive handling

⚠ **CAUTION:** Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.

Avoid exposing an internal hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package “FRAGILE.”

Grounding guidelines

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

An electronic device exposed to ESD may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

⚠ **CAUTION:** To prevent damage to the computer when you are removing or installing internal components, observe these precautions:

Keep components in their electrostatic-safe containers until you are ready to install them.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.

⚠ **CAUTION:** A product can be degraded by as little as 700 V.

Typical electrostatic voltage levels			
	Relative humidity		
Event	**10%**	**40%**	**55%**
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or non-conductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.

- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

The following table lists the shielding protection provided by antistatic bags and floor mats.

Material	Use	Voltage protection level
Antistatic plastics	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

5 Removal and replacement procedures for Customer Self-Repair parts

CAUTION: The Customer Self-Repair program is not available in all locations. Installing a part not supported by the Customer Self-Repair program may void your warranty. Check your warranty to determine if Customer Self-Repair is supported in your location.

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

NOTE: Please read and follow the procedures described here to access and replace Customer Self-Repair parts successfully.

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer.

This chapter provides removal and replacement procedures for Customer Self-Repair parts.

There are as many as 3 screws that must be removed, replaced, or loosened when servicing Customer Self-Repair parts. Make special note of each screw size and location during removal and replacement.

Battery

Description	Spare part number
4-cell, 41-Whr, 2.8-Ah Li-ion battery	800049-001

Before disassembling the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

To remove the battery:

1. Position the computer upside down on a flat surface.
2. Slide the battery lock latch **(1)**, and then slide the battery release latch **(2)** to release the battery.
3. Rotate the battery upward **(3)**, and then remove the battery from the computer **(4)**.

Optical drive

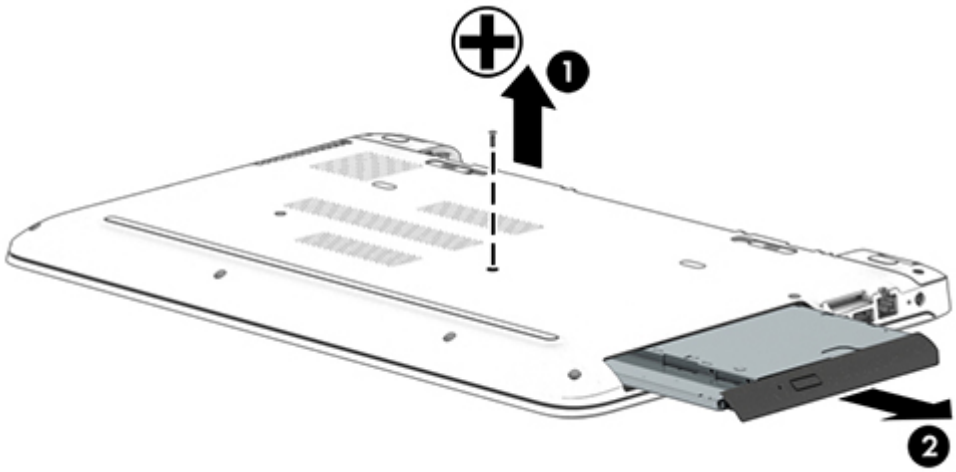
Description	Spare part number
DVD+/-RW Double-Layer SuperMulti Drive	
For use in silver models	809328-001
For use in white models	809329-001
For use in red models	809330-001
For use in blue models	809331-001
For use in pink models	809332-001
For use in purple models	809333-001
For use in black models	812889-001
Blu-ray Disc R/RW with SuperMulti Drive	
For use in silver models	809334-001

Before removing the optical drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).

To remove the optical drive:

1. Remove the Phillips PM2.5×7.0 screw **(1)** that secures the optical drive to the computer.
2. Remove the optical drive **(2)** by sliding it out of the optical drive bay.



Reverse this procedure to reassemble and install the optical drive.

6 Removal and replacement procedures for Authorized Service Provider parts

CAUTION: Components described in this chapter should only be accessed by an authorized service provider. Accessing these parts can damage the computer or void the warranty.

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer.

This chapter provides removal and replacement procedures for Authorized Service Provider only parts.

There are as many as 58 screws that must be removed, replaced, or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

Bottom cover

Description	Spare part number
Bottom cover hinge caps	809034-001
Rubber screw covers	809035-001
Bottom cover	
For use in purple models	809026-001
For use in sparkling black models	809345-001
For use in red models	809023-001
For use in white models	809022-001
For use in blue models	809024-001
For use in silver models	809021-001
For use in pink models	809025-001
Top cover/keyboard without backlight (includes touchpad)	
For use in Belgium	809031-A41
For use in Brazil	809031-201
For use in Bulgaria	809031-261
For use in the Czech Republic and Slovakia	809031-FL1
For use in Denmark, Finland, and Norway	809031-DH1
For use in French Canada	809031-DB1
For use in France	809031-051
For use in Germany	809031-041
For use in Greece	809031-151
For use in Hungary	809031-211
For use in Israel	809031-BB1
For use in Italy	809031-061
For use in Japan	809031-291
For use in Latin America	809031-161
For use in the Netherlands	809031-B31
For use in Portugal	809031-131
For use in Romania	809031-271
For use in Russia	809031-251
For use in Saudi Arabia	809031-171
For use in Spain	809031-071
For use in Slovenia	809031-BA1
For use in South Korea	809031-AD1

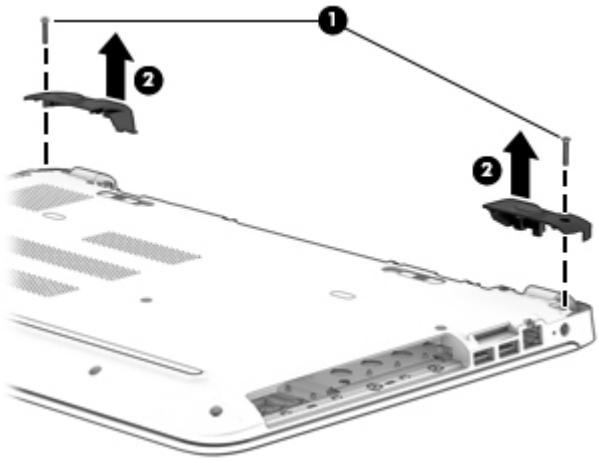
Description	Spare part number
For use in Switzerland	809031-BG1
For use in Taiwan	809031-AB1
For use in Thailand	809031-281
For use in Turkey	809031-141
For use in the United Kingdom	809031-031
For use in the United States	809031-001
Top cover/keyboard with backlight (includes touchpad)	
For use in French Canada	809032-DB1
For use in Saudi Arabia	809032-171
For use in Turkey	809032-141
For use in the United States	809032-001

Before removing the bottom cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).

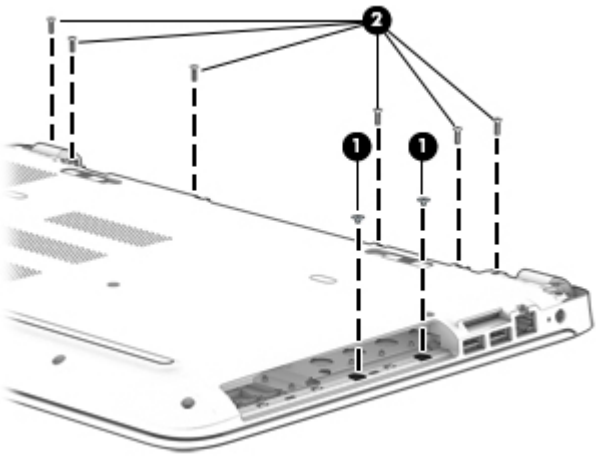
To remove the bottom cover:

1. Position the computer upside down with the front toward you.
2. Remove the two Phillips PM2.5×12.0 screws **(1)** that secure the hinge covers to the computer, and then lift the covers off the computer **(2)**.



3. Remove the two Phillips PM2.0×2.0 screws from the optical drive bay **(1)**.

4. Remove the six Phillips PM2.5×6.5 screws from near the battery bay **(2)**.



5. Position the computer upside down.

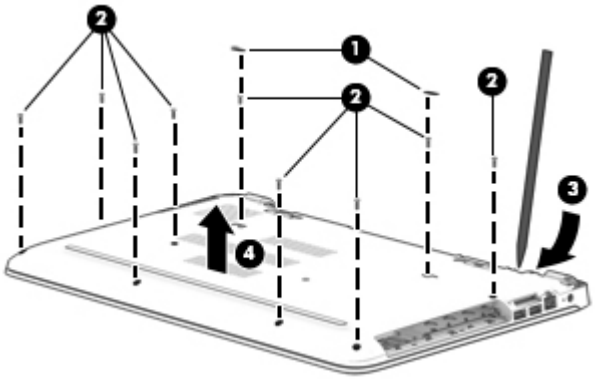
CAUTION: To avoid the hard drive falling out of the computer and getting damaged, be sure the computer is upside-down when removing the bottom cover.

6. Remove the two screw covers **(1)** and nine Phillips PM2.5×6.5 screws **(2)** that secure the top cover to the computer.

7. Use a non-marking tool **(3)** to disengage the bottom cover from the computer. You will have work around the seams on all sides of the computer.

CAUTION: To avoid damaging the cover, do not pry the cover near the optical drive bay.

8. Remove the bottom cover **(4)**.



Reverse this procedure to install the bottom cover.

Hard drive

NOTE: The hard drive spare part kit does not include the hard drive bracket.

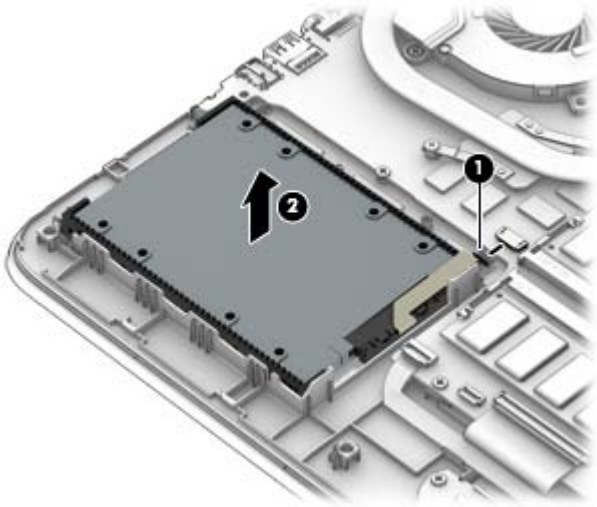
Description	Spare part number
2-TB, 5400-rpm, 2.5-inch	801808-005
1-TB, 5400-rpm, 2.5-inch, hybrid 8 GB SSD	731999-005
1-TB, 5400-rpm, 2.5-in	778192-005
750 GB, 5400 rpm, 2.5 in	778190-005
500-GB, 5400-rpm, 7 mm, hybrid 8 GB SSD	732000-005
500-GB, 5400-rpm, 2.5 inch	778188-005
Hard Drive Hardware Kit (brackets and connector)	809296-001

Before removing the hard drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).

To remove the hard drive:

1. Disconnect the hard drive cable from the system board **(1)**.
2. Lift the hard drive from the computer **(2)**.



3. To disassemble the hard drive, pull the brackets away from each side of the hard drive **(1)**.

4. Disconnect the hard drive connector and cable from the hard drive **(2)**.

Reverse this procedure to reassemble and install the hard drive.

WLAN module

Description	Spare part number
Intel Dual Band Wireless-AC 3160 802.11ac 1×1 WiFi + BT 4.0 Combo Adapter	710662-205
Intel Dual Band Wireless-AC 7265 802.11 ac 2x2 WiFi + BT 4.0 Combo Adapter (non vPRO)	784644-005
Realtek RTL8188EE 802.11b/g/n 1x1 Wi-Fi Adapter	792609-005
Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + BT4.0 Combo Adapter	792610-005

CAUTION: To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore device functionality, and then contact support.

Before removing the WLAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).

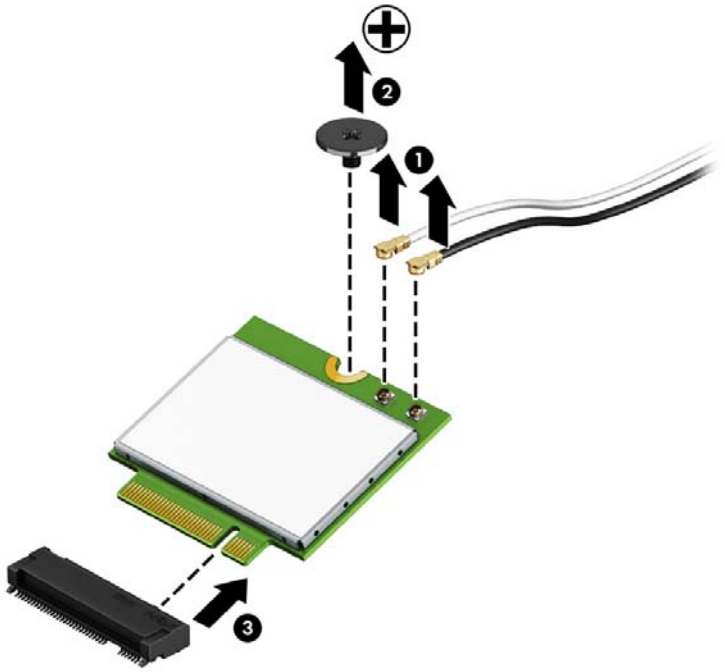
To remove the WLAN module:

1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

NOTE: The #1 WLAN antenna cable is connected to the WLAN module Main terminal. The #2 WLAN antenna cable is connected to the WLAN module Aux terminal.

2. Remove the Phillips PM2.0×3.0 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

3. Remove the WLAN module by pulling the module away from the slot at an angle **(3)**.



NOTE: If the WLAN antennas are not connected to the terminals on the WLAN module, the protective sleeves must be installed on the antenna connectors, as shown in the following illustration.

Reverse this procedure to install the WLAN module.

RTC battery

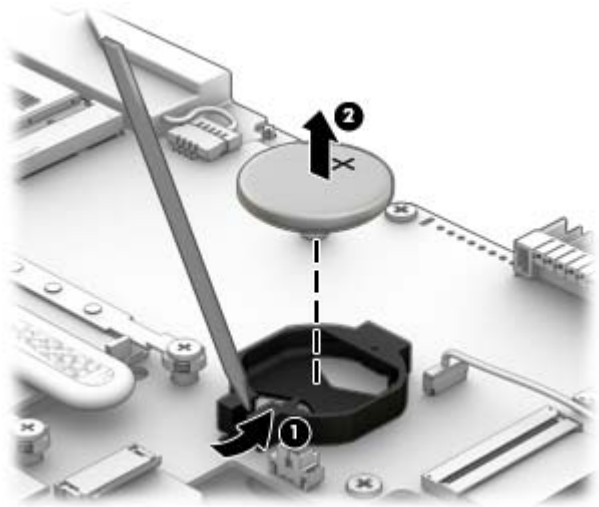
Description	Spare part number
RTC battery	811080-001

Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).

To remove the RTC battery:

▲ Using a thin tool or screwdriver, disengage the battery from the socket **(1)**, and then remove the battery **(2)**.



Reverse this procedure to install the RTC battery.

Memory module

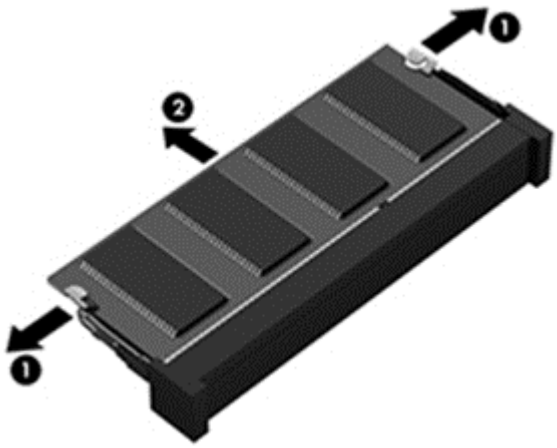
Description	Spare part number
8-GB (DDR3L-1600)	693374-005
4-GB (DDR3L-1600)	691740-005
2-GB (DDR3L-1600)	691739-005

Before removing a memory module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).

To remove a memory module:

1. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The memory module tilts up.)
2. Remove the memory module **(2)** by pulling it away from the slot at an angle.



Reverse this procedure to install a memory module.

Fan

Description	Spare part number
Fan	806747-001

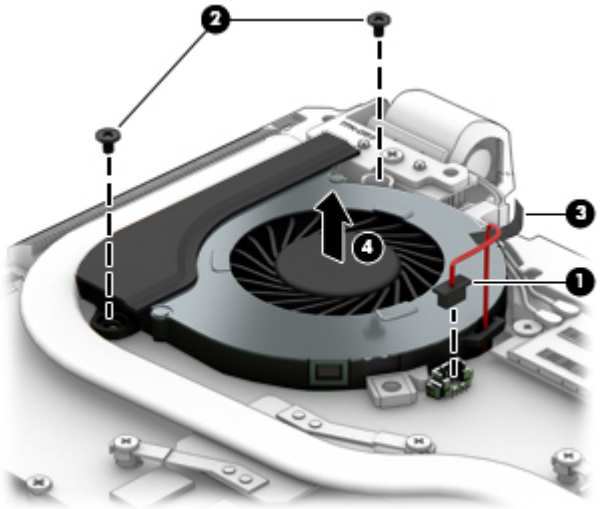
NOTE: To properly ventilate the computer, allow at least **7.6 cm** (3.0 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

Before removing the fan/heat sink assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).

To remove the fan:

1. Position the computer upright and open it.
2. Disconnect the fan cable **(1)** from the system board.
3. Remove the two Phillips PM3.0×3.0 screws **(2)** that secure the fan to the computer.
4. Lift the Mylar tape that secures the fan to the speaker **(3)**.
5. Remove the fan from the computer **(4)**.



Reverse this procedure to install the fan.

Heat sink assembly

NOTE: The heat sink assembly spare part kits include replacement thermal materials.

Description	Spare part number
Heat sink for use in models with discrete graphics	806827-001
Heat sink for use in models with UMA graphics and Intel Core processors	806826-001
Heat sink for use in models with UMA graphics and Intel Pentium and Celeron processors	809106-001

NOTE: To properly ventilate the computer, allow at least **7.6 cm** (3.0 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

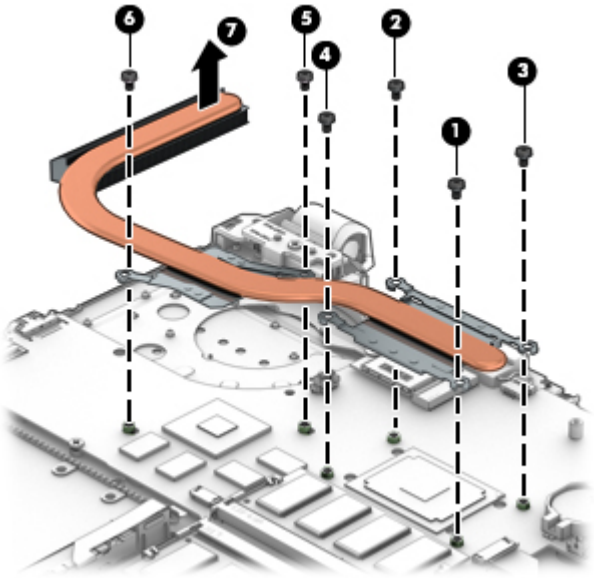
Before removing the heat sink assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).

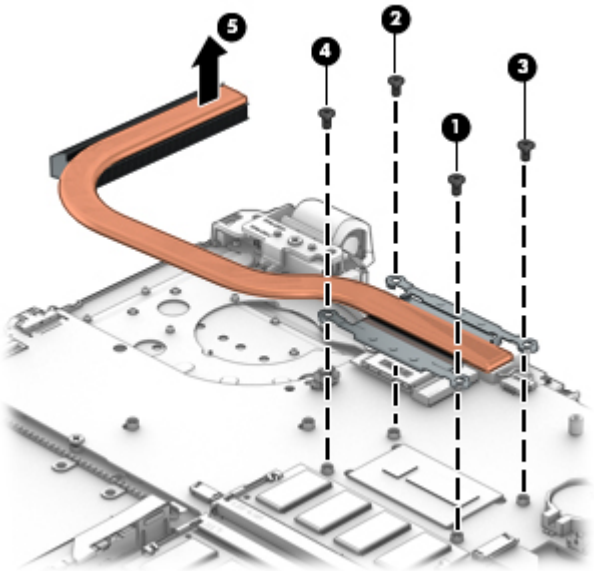
To remove the heat sink assembly:

1. Position the system board upside down.
2. If you have a model with discrete graphics, in the order indicated, remove the four Phillips PM2.0×3.0 screws **(1)** – **(4)** and the two Phillips PM2.5×4.0 screws **(5)** – **(6)** that secure the heat sink to the system board.

3. Remove the heat sink **(7)** from the system board.

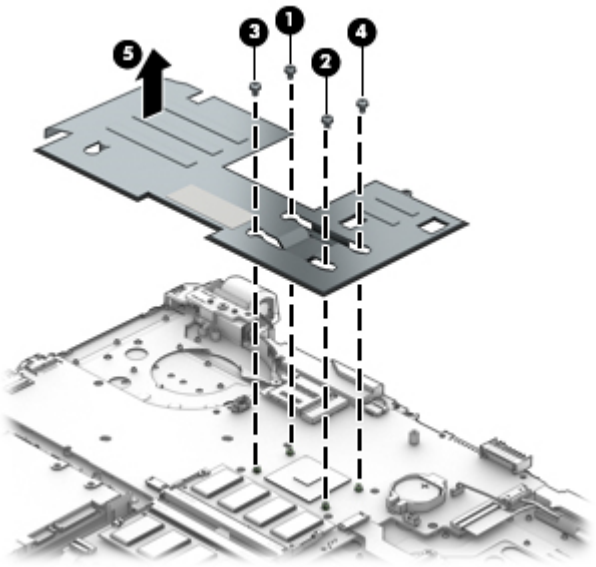


4. If you have a model with UMA graphics and an Intel Core processor, in the order indicated, remove the four Phillips PM2.0×3.0 screws **(1)** – **(4)** that secure the heat sink to the system board.
5. Remove the heat sink **(5)** from the system board.

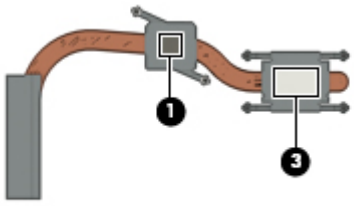


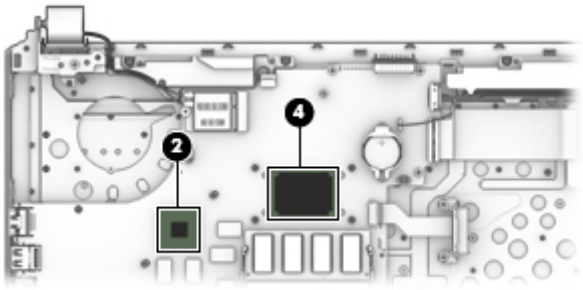
6. If you have a model with UMA graphics and an Intel Pentium or Celeron processor, in the order indicated, remove the four Phillips PM2.0×3.0 screws **(1)** – **(4)** that secure the heat sink to the system board.

7. Remove the heat sink **(5)** from the system board.

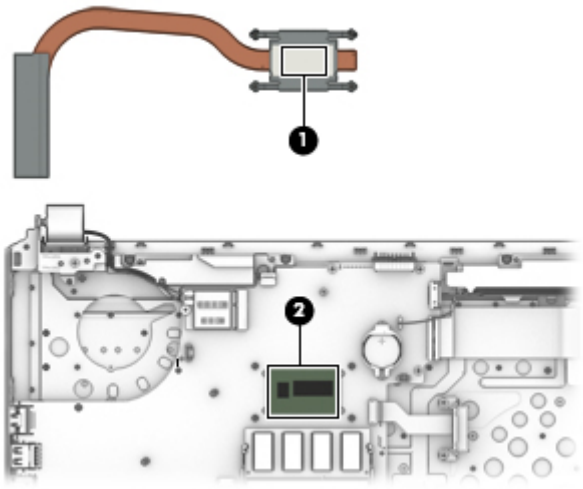


- **Discrete graphics:** Thermal paste is used on the processor and associated heat sink area **(1)(2)**, as well as the graphics chip and associated heat sink area **(3)(4)**.

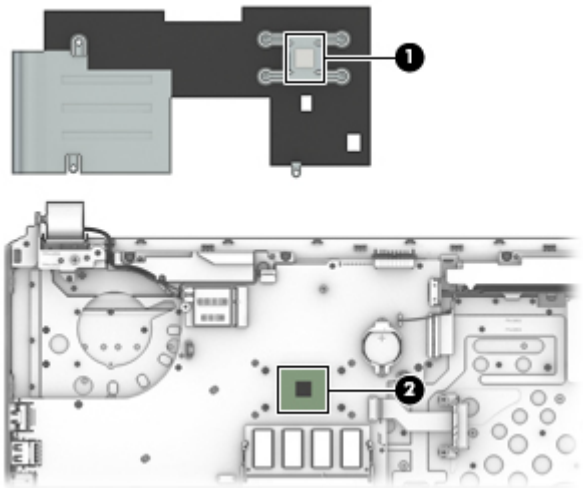




- **UMA graphics and an Intel Core processor:** Thermal paste is used on the heat sink **(1)** and the processor **(2)**.



- **UMA graphics and an Intel Pentium or Celeron processor:** Thermal paste is used on the heat sink **(1)** and the processor **(2)**.



Reverse this procedure to reassemble and install the heat sink assembly.

USB board

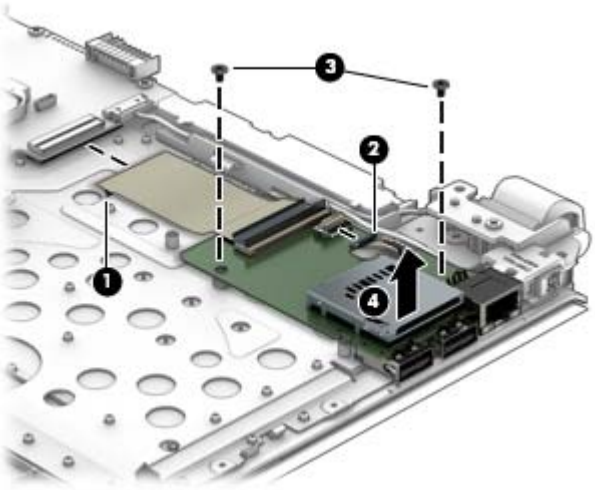
Description	Spare part number
USB board for use in models with Intel Core processors (includes cable)	809038-001
USB board for use in models with Intel Pentium processors (includes cable)	820000-001

Before removing the USB board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).

To remove the USB board:

1. Position the computer upright.
2. Disconnect the larger cable from the system board **(1)**.
3. Disconnect the smaller cable from the USB board that routes to the power button board **(2)**
4. Remove the two Phillips PM2.5×3.0 screws **(3)** that secure the USB board to the computer.
5. Remove the USB board **(4)**.



Reverse this procedure to install the USB board.

Optical drive connector

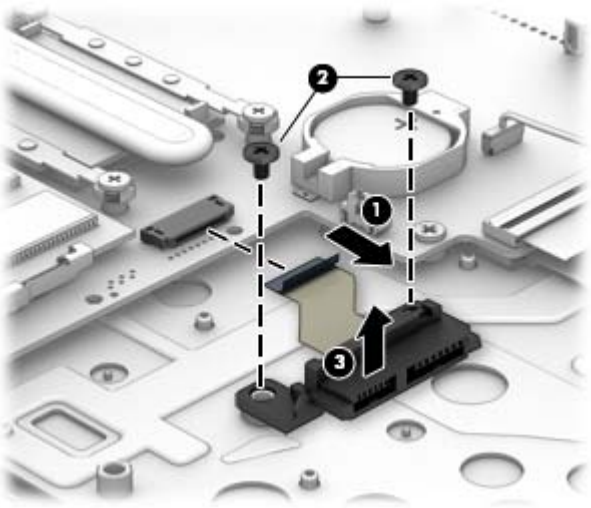
Description	Spare part number
Optical drive connector	811199-001

Before removing the optical drive connector, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).

To remove the optical drive connector:

1. Position the computer upright.
2. Disconnect the optical drive connector cable from the system board **(1)**.
3. Remove the two Phillips PM2.5×3.0 screws **(2)** that secure the optical drive connector to the computer.
4. Remove the optical drive connector and cable **(3)**.



Reverse this procedure to install the optical drive connector.

System board

NOTE: The system board spare part kit includes replacement thermal materials.

Description	Spare part number
System board (includes replacement thermal materials):	
All system boards use the following part numbers:	
xxxxxx-001: Without the Windows operating system	
xxxxxx-501: Windows 8.1 Standard	
xxxxxx-601: Windows 8.1 Professional	
For use in models with discrete graphics (NVIDIA N16S-GT (GeForce 940M)):	
• Intel Core i7-5500U processor and 2 GB of dedicated video memory	809045-xxx
• Intel Core i7-5200U processor and 4 GB of dedicated video memory	809046-xxx
• Intel Core i7-5200U processor and 2 GB of dedicated video memory	809044-xxx
For use in models with discrete graphics (AMD R7 M360 (Meso-XT)):	
• Intel Core i5-5200U processor and 2 GB of dedicated video memory	809043-xxx
• Intel Core i3-5010U processor and 2 GB of dedicated video memory	809042-xxx
For use in models with UMA graphics	
• Intel Core i7-5500U processor	819972-xxx
• Intel Core i5-5200U processor	809041-xxx
• Intel Core i3-5010U processor	809040-xxx
• Intel Pentium N3700 processor	817867-xxx

Before removing the system board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).

NOTE: When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory modules (see Memory module on page 41)
- WLAN module (see WLAN module on page 38)

- Heat sink assembly (see Heat sink assembly on page 43)
- Fan (see Fan on page 42)

To remove the system board:

1. Position the computer upright, and then disconnect the following cables from the system board:

   (1): Speaker cable

   (2): Display cable

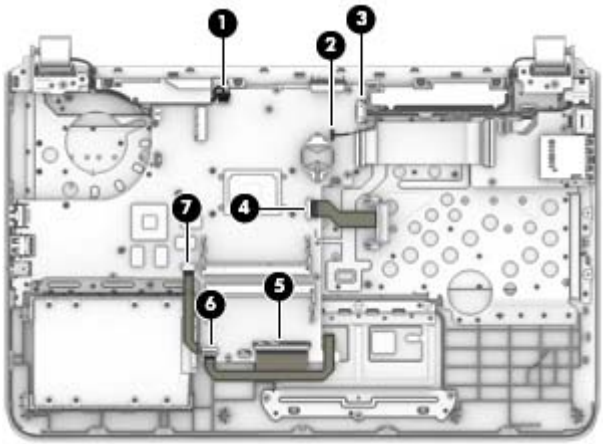
   (3): Power connector cable

   (4): Optical drive cable

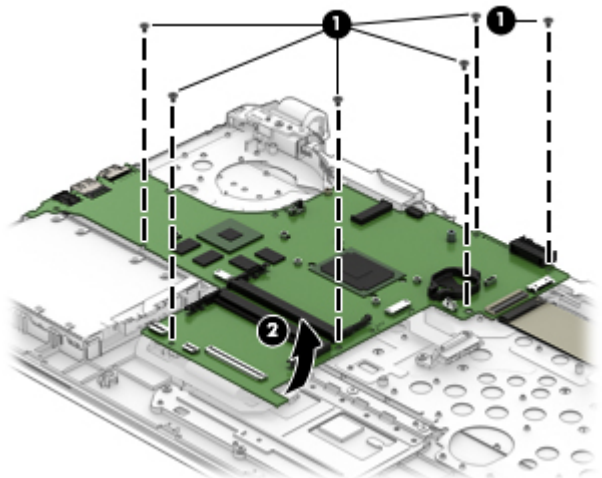
   (5): Keyboard cable

   (6): Touchpad cable

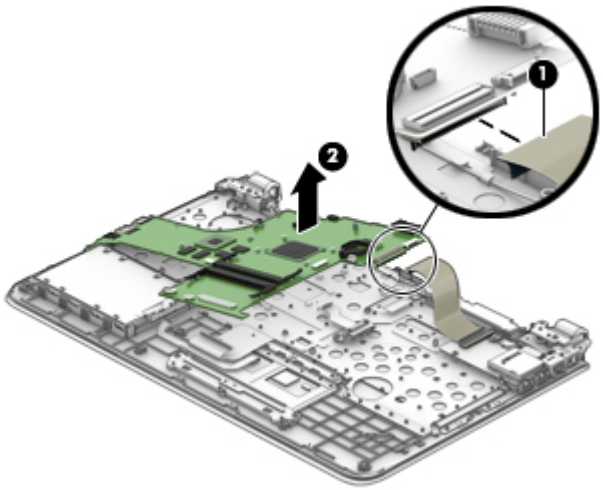
   (7): Hard drive cable



2. Remove the six Phillips PM2.0×3.0 screws **(1)** that secure the system board to the computer.
3. Lift the right side of the system board, and then lift the right side of the system board up to gain access to the USB board cable and connector underneath **(2)**.



4. Disconnect the USB board cable from the connector under the system board **(1)**, and the remove the system board from the computer **(2)**.



Reverse this procedure to install the system board.

Speakers

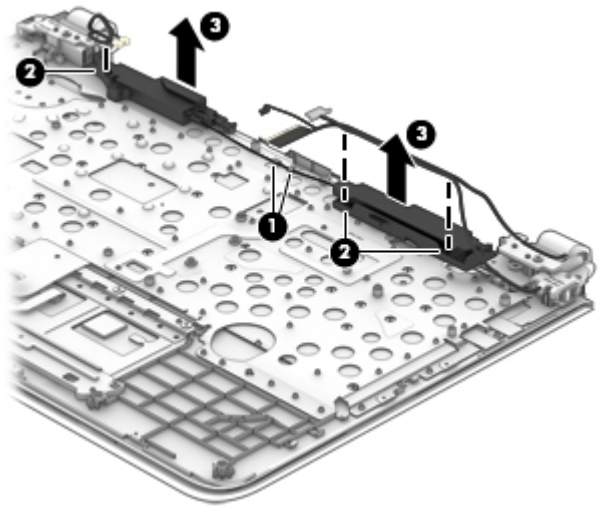
Description	Spare part number
Speakers (includes left and right speakers and cable)	809037-001

Before removing the speakers, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).
7. Remove the system board (see System board on page 49).

To remove the speakers:

1. Remove the speaker wire from the clips between the speakers **(1)**.
2. Remove the display cable from the channel at the top of the left speaker **(2)**.
3. Remove the speakers from the computer **(3)**.



Reverse this procedure to install the speakers.

Power button board

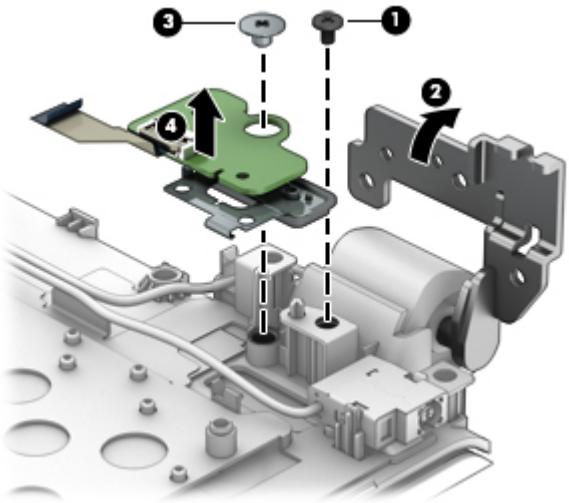
Description	Spare part number
Power button board (includes cable)	809033-001

Before removing the power button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).
7. Remove the system board (see System board on page 49).

To remove the power button board:

1. Remove the Phillips PM2.5×5.0 screw **(1)** from the left hinge.
2. Rotate the left hinge upward.
3. Remove the Phillips PM2.0×2.5 screw **(3)** that secures the power button board to the computer.
4. Remove the power button board from the computer **(4)**.



Reverse this procedure to install the power button board and cable.

Power connector cable

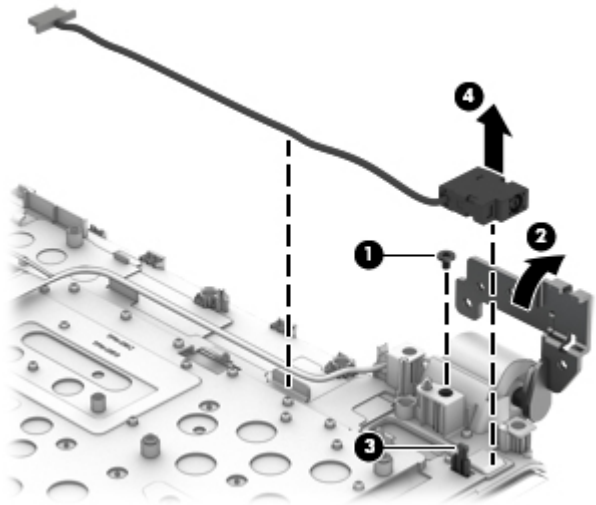
Description	Spare part number
Power connector cable	806746-001

Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).
7. Remove the system board (see System board on page 49).

To remove the power connector cable:

1. Remove the Phillips PM2.5×3.0 screw **(1)** from the left hinge that sits above the power connector.
2. Rotate the hinge upward **(2)**.
3. Pull the tab away from the connector **(3)**, and then remove the power connector and cable **(4)** from the computer.



Reverse this procedure to install the power connector cable.

TouchPad

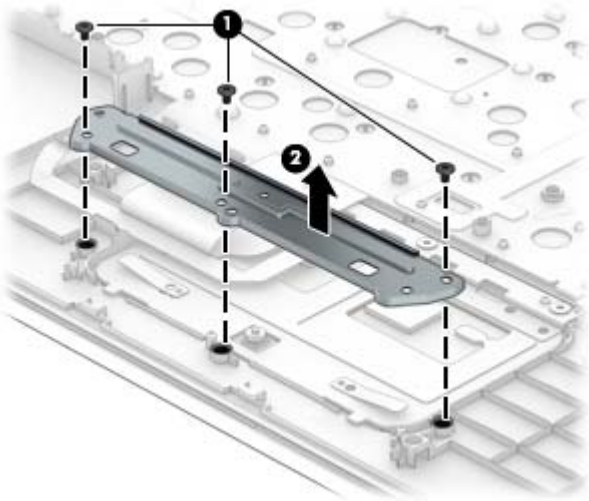
Description	Spare part number
TouchPad	813987-001

Before removing the TouchPad, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).
7. Remove the system board (see System board on page 49).

To remove the TouchPad:

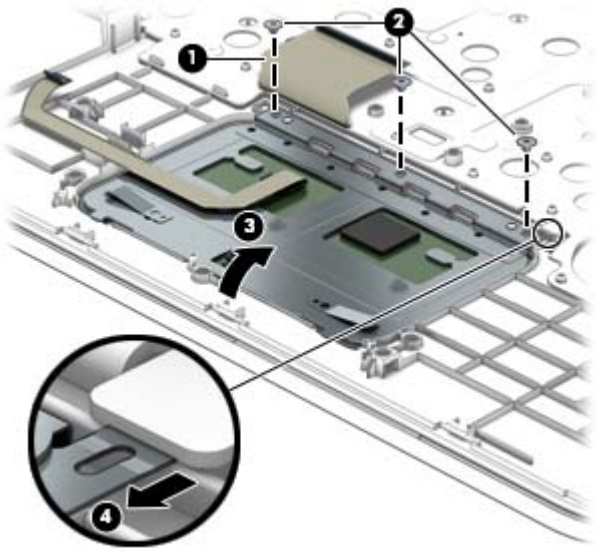
1. Remove the three Phillips PM2.5×3.0 screws **(1)** that secure the TouchPad bracket to the computer.
2. Remove the bracket **(2)**.



3. Lift the keyboard cable **(1)** to gain access to the TouchPad screws.
4. Remove the three broadhead Phillips PM2.0×2.0 screws **(2)** that secure the TouchPad to the computer.

5. Lift the bottom of touchpad up, and then pull it away from computer.**(3)**.

NOTE: When installing the TouchPad, note that the metal protrusion that extents from the touchpad is installed UNDER the keyboard shield **(4)**.



Reverse this procedure to install the touchpad.

Display assembly, non-touch

Description	Spare part number
Raw display panel (39.6-cm [15.6-in]; includes Mylar screw covers)	
BrightView, HD, flat	809371-001
AntiGlare, FHD, slim	809372-001
Antennas (include Mylar screw covers)	809008-001
Display bezel	809027-001
Display cable (includes Mylar screw covers)	
For use in non-touch displays	809028-001
For use in TOP (Touch On Panel) displays	809342-001
Display enclosure (includes Mylar screw covers)	
For use in non-touch models:	
• Black models	809343-001
• Red models	809011-001
• White models	809010-001
• Silver models	809009-001
• Blue models	809012-001
• Purple models	809014-001
• Pink models	809013-001
For use in TOP (touch on panel) models:	
• Black models	818657-001
• Red models	818653-001
• White models	817836-001
• Silver models	817835-001
• Blue models	818654-001
• Purple models	818656-001
• Pink models	818655-001
Hinges (left and right) (include Mylar screw covers)	809030-001
Webcam/microphone module	806758-001

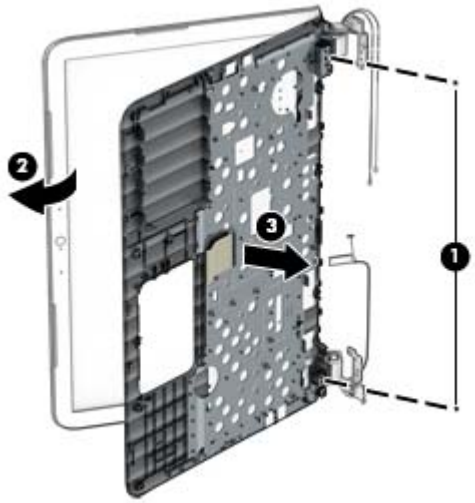
Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).
7. Remove the system board (see System board on page 49).

To remove the display assembly:

1. Position the computer on its side, partially open.
2. Remove the two Phillips PM2.5×5.0 screws **(1)** that secure the display assembly to the computer.
3. Open the display to rotate the hinges upward to an angle **(2)**.
4. Separate the display assembly from the computer **(3)**.

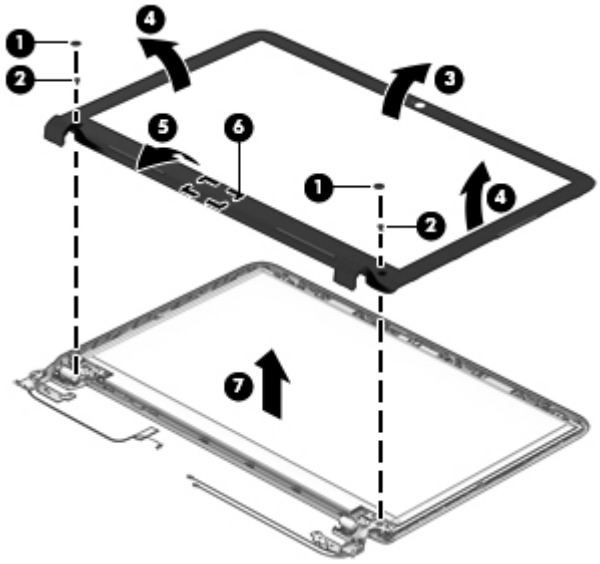


If it is necessary to replace any of the display assembly subcomponents:

1. To remove the display bezel:
   a. Remove the two screw covers **(1)** and the two Phillips PM2.0×3.0 screws **(2)** that secure the display assembly to the computer.
   b. Flex the inside of the top edge **(3)**, the left and right edges **(4)**, and the bottom edge **(5)** of the display bezel until the bezel disengages from the display enclosure.
   c. Disengage the double-sided tape located in the middle, bottom of the bezel (under the logo) **(6)**.

d. Remove the display bezel **(7)**.

The display bezel is available using spare part number 809027-001.



2. To remove the webcam/microphone module:

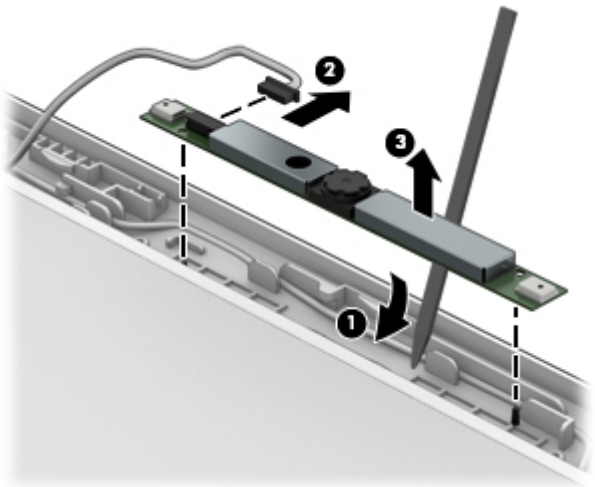
a. Position the display assembly with the top edge toward you.

b. Use a tool to pry the webcam and disengage the adhesive that secures it to the display **(1)**.

c. Disconnect the cable **(2)** from the module.

d. Remove the webcam/microphone module from the display **(3)**.

The webcam for non-touch models is available using spare part number 806758-001.

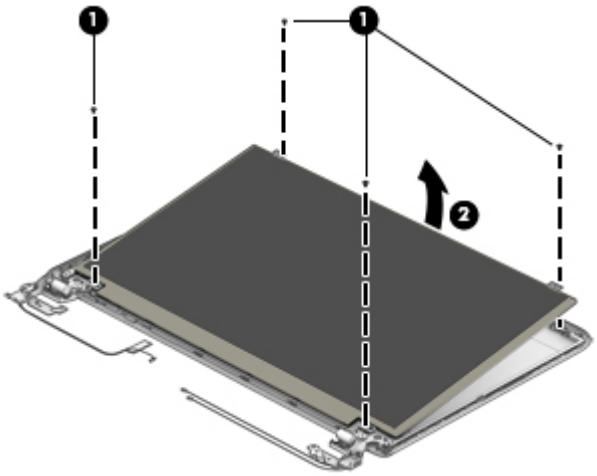


3. To remove the display panel:

a. Remove the four Phillips PM2.0×3.0 screws that secure the display panel to the enclosure **(1)**.

b. Lift the top of the panel **(2)**.

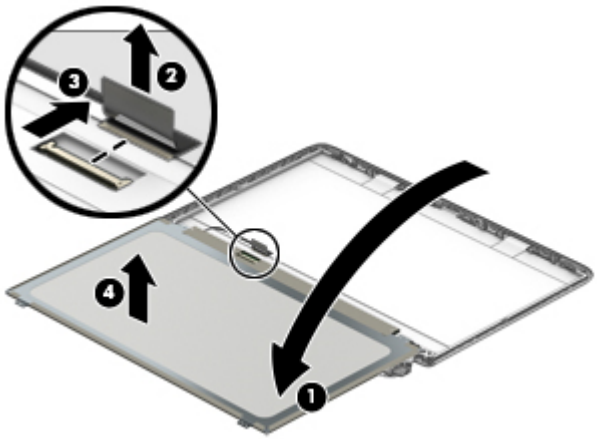
Raw display panels are available using spare part number 809371-001 for BrightView HD panels and 809372-01 for AntiGlare FHD panels.



c. Rotate the display panel until it is upside-down next to the display enclosure **(1)**.

d. On the back of the display panel, release the adhesive strip **(2)** that secures the display panel cable to the display panel, and then disconnect the cable **(3)**.

e. Remove the display panel from the enclosure **(4)**.

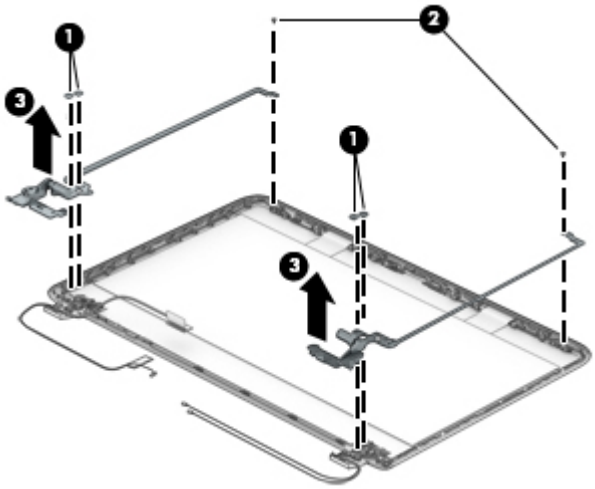


4. To remove the display hinges:

a. Remove the four Phillips PM2.0×3.0 screws **(1)** from the bottom of the hinges, and the two Phillips PM2.0×3.0 screws **(2)** from the top of the hinges that secure the display hinges to the display enclosure.

b. Remove the display hinges **(3)**.

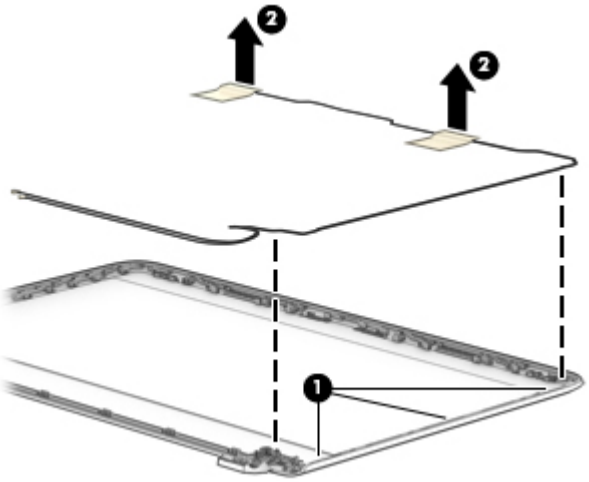
Display hinges are available using spare part number 809030-001.



5. To remove the wireless antenna cables and transceivers, release the wireless antenna cables from the clips **(1)** built into the display enclosure, peel the transceivers from the enclosure, and then remove the antenna cables and transceivers **(2)**.

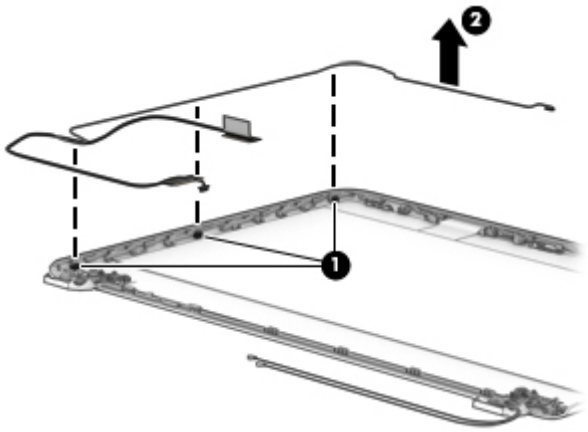
   Antennas for non-touch models are available using spare part number 809008-001.

NOTE: Number of antennas and transceivers may vary.



6. To remove the display/webcam cable, remove the cable from the clips built into the display enclosure **(1)**, and then remove the cable from the display enclosure **(2)**.

   The display cable is available using spare part number 809028-001 for non-touch models and 809342-001 for TOP (Touch On Panel) displays.



7. If replacing the display enclosure, be sure that the subcomponents (including the webcam/microphone module, the antenna receivers, and all associated cables and hardware) are transferred to the new enclosure.

   The display enclosure is available using the following spare part numbers:

   809009-001: Silver models, non-touch

   809010-001: White models, non-touch

   809011-001: Red models, non-touch

   809012-001: Blue models, non-touch

   809013-001: Pink models, non-touch

   809014-001: Purple models, non-touch

   809343-001: Black models, non-touch

   817835-001: Silver models, TOP models

   817836-001: White models, TOP models

   818653-001: Red models, TOP models

   818654-001: Blue models, TOP models

   818655-001: Pink models, TOP models

   818656-001: Purple models, TOP models

   818657-001: Black models, TOP models

Reverse this procedure to reassemble and install the display assembly.

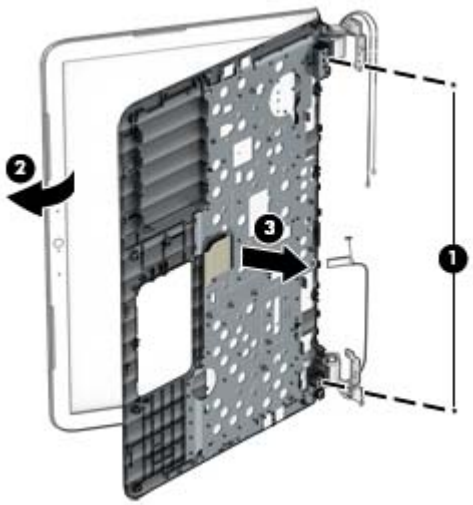
Display assembly, touch

Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 30).
5. Remove the optical drive (see Optical drive on page 30).
6. Remove the bottom cover (see Bottom cover on page 34).
7. Remove the system board (see System board on page 49).

To remove the display assembly:

1. Position the computer on its side, partially open.
2. Remove the two Phillips PM2.5×5.0 screws **(1)** that secure the display assembly to the computer.
3. Open the display to rotate the hinges upward to an angle **(2)**.
4. Separate the display assembly from the computer **(3)**.



If it is necessary to replace any of the display assembly subcomponents:

1. To remove the display cover:
   a. Pry up on each side of the display to disengage the cover **(1)**.

b. Remove the display cover **(2)**.

The display enclosure is available using the following spare part numbers:

809015-001: Silver models

809016-001: White models

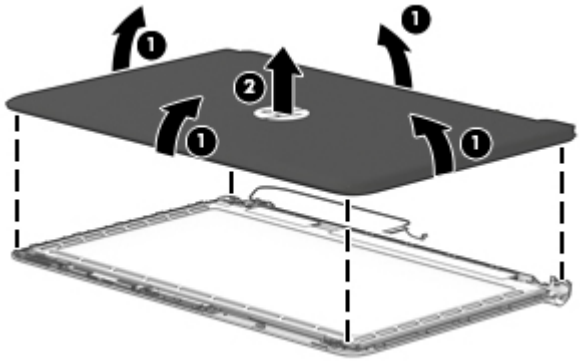
809017-001: Red models

809018-001: Blue models

809019-001: Pink models

809020-001: Purple models

809344-001: Black models



2. To remove the webcam/microphone module:

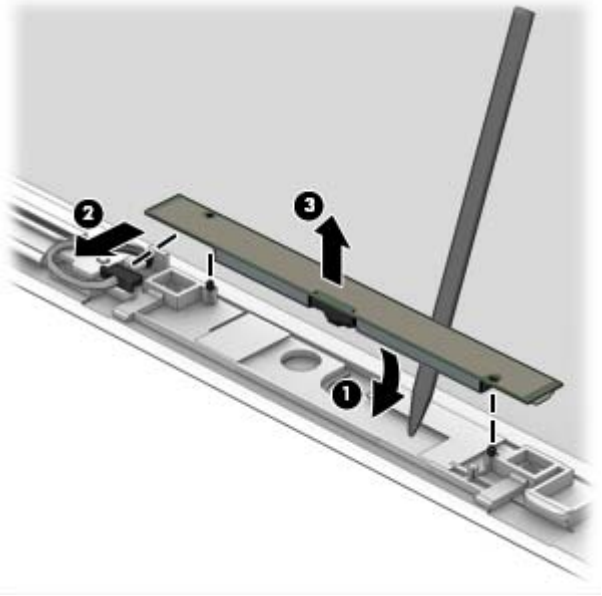
   a. Position the display assembly with the top edge toward you.

   b. Use a tool to pry the webcam and disengage the adhesive that secures it to the display **(1)**.

   c. Disconnect the cable **(2)** from the module.

d. Remove the webcam/microphone module from the display **(3)**.

The webcam for touch displays is available using spare part number 810961-001.



3. To remove the display panel:

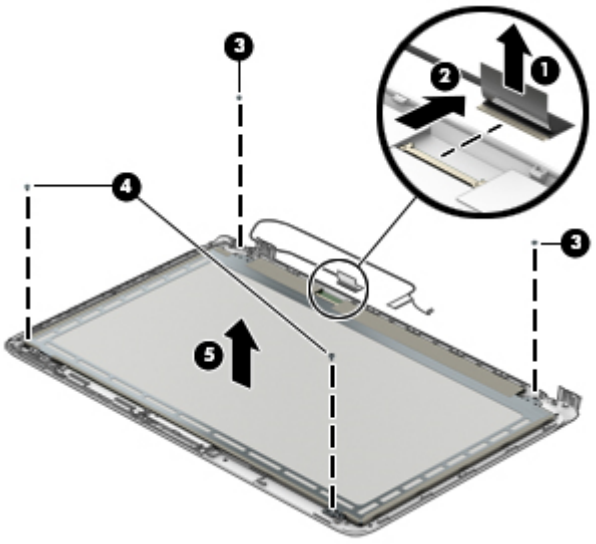
a. Lift the tape that secures the display cable to the connector on the back of the panel **(1)**, and then disconnect the display cable **(2)**.

b. Remove the two Phillips PM2.0×1.5 screws **(3)** that secure the display panel to the bottom of the enclosure.

c. Remove the two Phillips PM2.0×2.0 screws **(4)** that secure the display panel to the top of the enclosure.

d. Lift the top of the panel **(5)**.

The display panel is available using spare part number 813109-001.

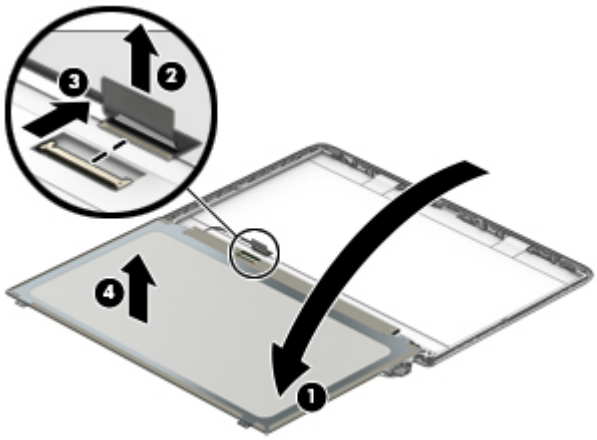


e. Rotate the display panel until it is upside-down next to the display enclosure **(1)**.

f. On the back of the display panel, release the adhesive strip **(2)** that secures the display panel cable to the display panel, and then disconnect the cable **(3)**.

g. Remove the display panel from the enclosure **(4)**.

The display panel is available using spare part number 809341-001.

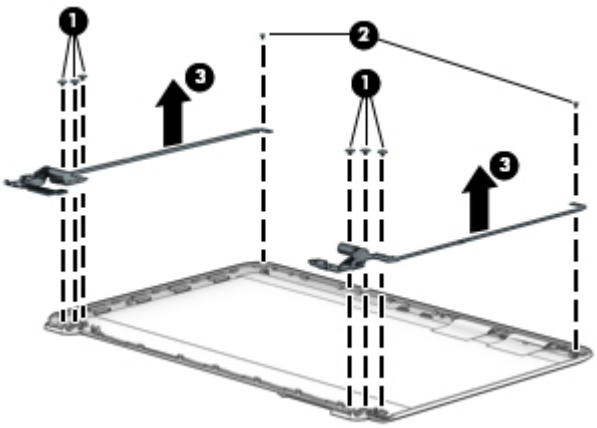


4. To remove the display hinges:

a. Remove the six Phillips PM2.5×2.0 screws **(1)** from the bottom of the hinges, and the two Phillips PM2.0×2.5 screws **(2)** from the top of the hinges that secure the display hinges to the display enclosure.

b. Remove the display hinges **(3)**.

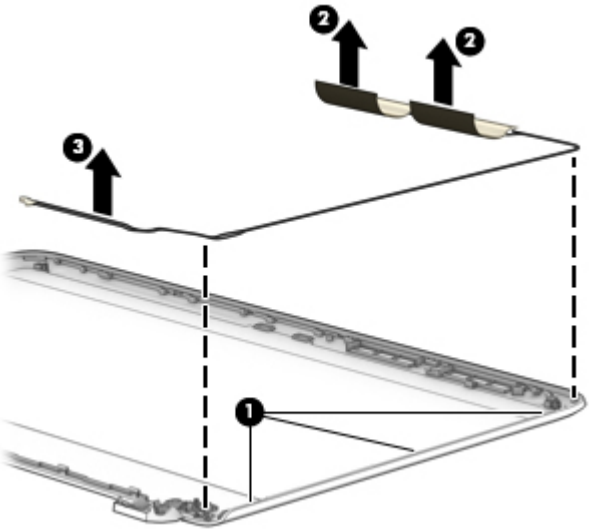
The display hinges are available using spare part number 813345-001.



5. To remove the wireless antenna cables and transceivers, release the wireless antenna cables from the clips **(1)** built into the display enclosure, peel the transceivers from the enclosure **(2)**, and then remove the antenna cables and transceivers **(3)**.

   The antennas are available using spare part number 811201-001.

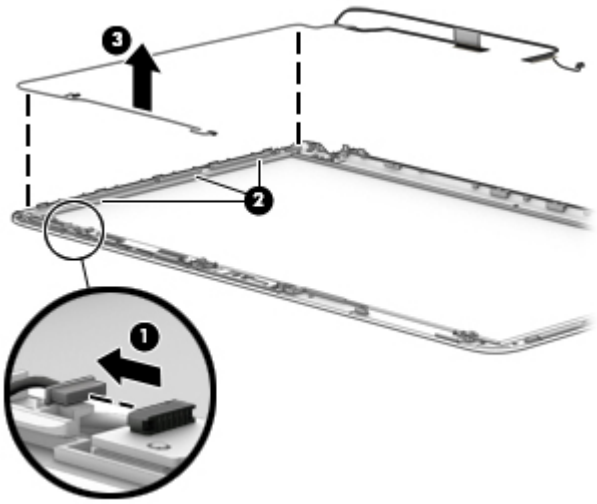
NOTE: Number of antennas and transceivers may vary.



6. Disconnect the cable from the touch control board **(1)**.

7. To remove the display/webcam cable, remove the cable from the clips built into the display enclosure **(2)**, and then remove the cable from the display enclosure **(3)**.

   The display cable is available using spare part number 809342-001 for TOP (Touch On Panel) displays and 811222-001 for touch displays.



8. If replacing the display enclosure, be sure that the subcomponents (including the webcam/microphone module, the antenna receivers, and all associated cables and hardware) are transferred to the new enclosure.

Reverse this procedure to reassemble and install the display assembly.

7 Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

To start HP PC Hardware Diagnostics (UEFI):

1. Start Setup Utility:

   ▲ Turn on or restart the computer, quickly press esc.

2. Press or tap **f2**.

   The BIOS searches 3 places for the diagnostic tools, in the following order:

   a. Connected USB drive

   NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 69.

   b. Hard drive

   c. BIOS

3. When the diagnostic tool opens, use the keyboard arrow keys to select the type of diagnostic test you want to run, and then follow the on-screen instructions.

NOTE: If you need to stop a diagnostic test, press or tap esc.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

NOTE: Instructions for downloading HP PC Hardware Diagnostics (UEFI) are provided in English only.

There are two options to download HP PC Hardware Diagnostics to a USB device:

Download the latest UEFI version:

1. Go to http://hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.
2. In the HP PC Hardware Diagnostics section, click the **Download** link, and then select **Run**.

Download any version of UEFI for a specific product:

1. Go to http://www.hp.com/support, and then select your country. The HP Support page is displayed.
2. Click **Drivers & Downloads**.
3. In the text box, enter the product name, and then click **Go**.

   – or –

   Click **Find Now** to let HP automatically detect your product.
4. Select your computer model, and then select your operating system.
5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

8 Using Setup Utility (BIOS) in Windows 8.1

Setup Utility, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Setup Utility (BIOS) includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

NOTE: To start the Setup utility, your computer must be in notebook mode and you must use the keyboard attached to your notebook. The on-screen keyboard which displays in tablet mode cannot access the Setup Utility.

Starting Setup Utility (BIOS)

CAUTION: Use extreme care when making changes in Setup Utility (BIOS). Errors can prevent the computer from operating properly.

NOTE: If your tablet has a keyboard base, connect the tablet to the keyboard base before beginning the steps in this chapter.

- Computers or tablets with keyboards:
  - ▲ Turn on or restart the computer, quickly press esc, and then press f10.
- Tablets without keyboards:
  1. Turn on or restart the tablet, and then quickly hold down the volume down button.

     - or -

     Turn on or restart the tablet, and then quickly hold down the Windows button.
  2. Tap **f10**.

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To determine whether available BIOS updates contain later BIOS versions than the one currently installed on the computer, you need to know the version of the system BIOS that is installed.

BIOS version information (also known as *ROM date* and *System BIOS*) can be revealed from the Start screen by typing `support`, selecting the **HP Support Assistant** app, selecting **My computer**, and then selecting **System Information**, or by using Setup Utility (BIOS).

1. Start Setup Utility (BIOS) (see Starting Setup Utility (BIOS) on page 71).
2. Select **Main**, and then make note of your BIOS version.
3. Select **Exit**, select **Exit Discarding Changes**, and then follow the on-screen instructions.

Downloading a BIOS update

CAUTION: To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

- Do not disconnect power from the computer by unplugging the power cord from the AC outlet.
- Do not shut down the computer or initiate Sleep.
- Do not insert, remove, connect, or disconnect any device, cable, or cord.

NOTE: If your computer is connected to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

1. From the Start screen, type `support`, and then select the **HP Support Assistant** app.

   – or –

   From the Windows desktop, click the question mark icon in the taskbar area of the Windows desktop.
2. Click **Updates and tune-ups**, and then click **Check for HP updates now**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:

   a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS, make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

   b. Follow the on-screen instructions to download your selection to the hard drive.

   If the update is more recent than your BIOS, make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

BIOS installation procedures vary. Follow any instructions that appear on the screen after the download is complete. If no instructions appear, follow these steps:

1. From the Start screen, type `file`, and then select **File Explorer**.

   – or –

   From the Windows desktop, right-click the **Start** button, and then select **File Explorer**.
2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.

4. Double-click the file that has an .exe extension (for example, *filename*.exe).

   The BIOS installation begins.

5. Complete the installation by following the on-screen instructions.

NOTE: After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Synchronizing a tablet and keyboard (select models only)

When you attach a tablet to the keyboard and restart the computer, the BIOS checks to see if the Embedded Controller firmware on the keyboard needs to be synchronized. If so, BIOS will start the synchronization. If the synchronization is interrupted, a notification screen displays for 10 seconds before the tablet restarts and attempts to synchronize again.

NOTE: The Embedded Controller firmware will synchronize ONLY if the tablet or keyboard battery is more than 50% charged, or if your tablet is connected to AC power.

9 Using Setup Utility (BIOS) in Windows 7

Setup Utility, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Setup Utility (BIOS) includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

Starting Setup Utility (BIOS)

▲ To start Setup Utility (BIOS), turn on or restart the computer, quickly press esc, and then press f10.

NOTE: Use extreme care when making changes in Setup Utility (BIOS). Errors can prevent the computer from operating properly.

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.

BIOS version information (also known as *ROM date* and *System BIOS*) can be displayed by pressing fn+esc (if you are already in Windows) or by using Setup Utility (BIOS).

1. Start Setup Utility (BIOS).
2. Use the arrow keys to select **Main**, and then make note of your current BIOS version.
3. To exit Setup Utility (BIOS) without saving your changes, use the tab key and the arrow keys to select **Exit > Exit Discarding Changes**, and then press enter.

Downloading a BIOS update

CAUTION: To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

Do not disconnect power from the computer by unplugging the power cord from the AC outlet.

Do not shut down the computer or initiate Sleep or Hibernation.

Do not insert, remove, connect, or disconnect any device, cable, or cord.

1. Select **Start**, type `hp support assistant`, and then select the **HP Support Assistant** program.
2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
3. At the download area, follow these steps:
   a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
   b. Follow the on-screen instructions to download your selection to the hard drive.

      Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

NOTE: If you connect your computer to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

BIOS installation procedures vary. Follow any instructions that are displayed on the screen after the download is complete. If no instructions are displayed, follow these steps:

1. Open Windows Explorer by selecting **Start > Computer**.
2. Double-click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename*.exe).

   The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.

NOTE: After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

To start HP PC Hardware Diagnostics UEFI:

1. Turn on or restart the computer, quickly press esc, and then press f2.

   The BIOS searches three places for the diagnostic tools, in the following order:
   a. Connected USB drive

      NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 69.
   b. Hard drive
   c. BIOS
2. When the diagnostic tool opens, use the keyboard arrow keys to select the type of diagnostic test you want to run, and then follow the on-screen instructions.

NOTE: If you need to stop a diagnostic test, press esc.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

NOTE: Instructions for downloading HP PC Hardware Diagnostics (UEFI) are provided in English only.

There are two options to download HP PC Hardware Diagnostics to a USB device:

Download the latest UEFI version:

1. Go to http://hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.
2. In the HP PC Hardware Diagnostics section, click the **Download** link, and then select **Run**.

Download any version of UEFI for a specific product:

1. Go to http://www.hp.com/support, and then select your country. The HP Support page is displayed.
2. Click **Drivers & Downloads**.
3. In the text box, enter the product name, and then click **Go**.

   – or –

   Click **Find Now** to let HP automatically detect your product.
4. Select your computer model, and then select your operating system.
5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

10 Backing up, restoring, and recovering in Windows 8.1

This chapter provides information about the following processes. The information in the chapter is standard procedure for most models.

- Creating recovery media and backups
- Restoring and recovering your system

For additional information, refer to the HP Support Assistant.

▲ From the Start screen, type `support`, and then select the **HP Support Assistant** app.

- or -

From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

Creating recovery media and backups

The following methods of creating recovery media and backups are available on select models only. Choose the available method according to your computer model.

- Use HP Recovery Manager after you successfully set up the computer to create HP Recovery media. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see Creating HP Recovery media (select models only) on page 79. For information on the recovery options that are available using the recovery media, see Recovering using HP Recovery Manager on page 81.
- Use Windows tools to create system restore points and create backups of personal information.

  For more information, see Using Windows tools on page 80.

NOTE: If storage is 32 GB or less, Microsoft System Restore is disabled by default.

Creating HP Recovery media (select models only)

IMPORTANT: If your computer does not list a Recovery Media Creation option, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

HP Recovery Manager is a software program that allows you to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and the software programs installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.

- Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
- HP Recovery Manager examines the computer and determines the required storage capacity for the media that will be required.
- To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or, instead, you can use a high-quality blank USB flash drive.
- If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs, or you can obtain recovery discs for your computer from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub.
- Be sure that the computer is connected to AC power before you begin creating the recovery media.
- The creation process can take an hour or more. Do not interrupt the creation process.
- If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue, and the remaining discs will be burned.

To create HP Recovery media:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.
2. Select **Recovery Media Creation**, and then follow the on-screen instructions.

If you ever need to recover the system, see Recovering using HP Recovery Manager on page 81.

Using Windows tools

You can create system restore points and create backups of personal information using Windows tools.

NOTE: If storage is 32 GB or less, Microsoft System Restore is disabled by default.

- From the Start screen, type `help`, and then select **Help and Support**.

  – or –

  From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

For more information and steps, see Help and Support.

Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

IMPORTANT: Not all methods are available on all models.

- Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information see Help and Support.

  ▲ From the Start screen, type `support`, and then select the **HP Support Assistant** app.

  - or -

  From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

- If you need to correct a problem with a preinstalled application or driver, use the Drivers and Applications Reinstall option of HP Recovery Manager to reinstall the individual application or driver.

  ▲ From the Start screen, type `recovery`, select **HP Recovery Manager**, select **Drivers and Applications Reinstall**, and then follow the on-screen instructions.

- On select models, if you want to reset your computer using a minimized image, you can choose the HP Minimized Image Recovery option from the HP Recovery partition or HP Recovery media. Minimized Image Recovery installs only drivers and hardware-enabling applications. Other applications included in the image continue to be available for installation through the Drivers and Applications Reinstall option in HP Recovery Manager.

  For more information, see Recovering using HP Recovery Manager on page 81.

- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select models only) or use the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 81. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 79.

- On select models, if you want to recover the computer's original factory partition and content , or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 81.

- On select models, if you want to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

  For more information, see Removing the HP Recovery partition (select models only) on page 83.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from support, or by using the HP Recovery partition (select models only). If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 79.

What you need to know before you get started

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.

IMPORTANT: Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

- HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 79.

- To use the Factory Reset option (select models only), you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 79.
- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

IMPORTANT: HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you want to retain.

Using HP Recovery media, you can choose from one of the following recovery options:

NOTE: Only the options available for your computer display when you start the recovery process.

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.
- Minimized Image Recovery (select models only)—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.
- Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select models only) allows System Recovery and Minimized Image Recovery (select models only).

Using the HP Recovery partition (select models only)

The HP Recovery partition allows you to perform a system recovery or minimized image recovery (select models only) without the need for recovery discs or a recovery USB flash drive. This type of recovery can be used only if the hard drive is still working.

To start HP Recovery Manager from the HP Recovery partition:

1. From the Start screen, type `recovery`, select **Recovery Manager**, and then select **HP Recovery Environment**.

   - or-

   Press f11 while the computer boots, or press and hold f11 as you press the power button.
2. Select **Troubleshoot** from the boot options menu.
3. Select **Recovery Manager**, and then follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.
2. Insert the HP Recovery media, and then restart the computer.

   NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 83.
3. Follow the on-screen instructions.

Changing the computer boot order

If your computer does not restart in HP Recovery Manager, you can change the computer boot order, which is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection for an optical drive or a USB flash drive.

To change the boot order:

1. Insert the HP Recovery media.
2. Start Computer Setup:
   - ▲ Turn on or restart the computer, quickly press esc, and then press f9 for boot options.
3. Select the optical drive or USB flash drive from which you want to boot.
4. Follow the on-screen instructions.

Removing the HP Recovery partition (select models only)

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

IMPORTANT: After you remove the HP Recovery partition, you can no longer use the Windows Refresh option or the Windows option to remove everything and reinstall Windows. In addition, you will not be able to perform System Recovery or Minimized Image Recovery from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media (select models only) on page 79.

Follow these steps to remove the HP Recovery partition:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.
2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

11 Backing up, restoring, and recovering in Windows 7

Your computer includes tools provided by the operating system and HP to help you safeguard your information and retrieve it if ever needed.

Creating backups

1. Use HP Recovery Manager to create recovery media immediately after you set up the working computer.
2. As you add hardware and software programs, create system restore points.
3. As you add photos, video, music, and other personal files, create a backup of your system and personal information.

Creating recovery media to recover the original system

After you successfully set up the computer, you should create recovery discs or a recovery flash drive using HP Recovery Manager. You will need these recovery discs or recovery flash drive to perform a system recovery should the hard drive become corrupted. A system recovery reinstalls the original operating system, and then configures the settings for the default programs.

What you need to know

- Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
- HP Recovery Manager examines the computer and determines the required storage capacity for the flash drive or the number of blank DVD discs that will be required.

  Use DVD-R, DVD+R, DVD-R DL, DVD+R DL discs or a flash drive. Do not use rewriteable discs such as CD ±RW, DVD±RW, double-layer DVD±RW, and BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software.
- If your computer does not include an integrated optical drive, you can use an optional external optical drive (purchased separately) to create recovery discs, or you can obtain recovery discs for your computer from the HP website. If you use an external optical drive, it must be connected directly to a USB port on the computer, not to a USB port on an external device, such as a USB hub.
- Be sure that the computer is connected to AC power before you begin creating the recovery media.
- The creation process can take up to an hour or more. Do not interrupt the creation process.
- Store the recovery media in a safe location, separate from the computer.
- If necessary, you can exit the program before you have finished creating the recovery media. The next time you open HP Recovery Manager, you will be prompted to continue the process.

Creating the recovery media

1. Select **Start** and type `recovery` in the search field. Select **Recovery Manager** from the list. Allow the action to continue, if prompted.
2. Click **Recovery Media Creation**.
3. Follow the on-screen instructions to continue.

To recover, see Recovering the original system using HP Recovery Manager on page 88.

Creating system restore points

A system restore point is a snapshot of certain hard drive contents saved by Windows System Restore at a specific time. A restore point contains information such as registry settings that Windows uses. Restoring to a previous restore point allows you to reverse changes that have been made to the system since the restore point was created.

Restoring to an earlier system restore point does not affect data files saved or emails created since the last restore point, but it does affect software you may have installed.

For example, if you download a photo from a digital camera and then restore the computer to the state it was on the previous day, the photo remains on the computer.

However, if you install photo viewing software and then restore your computer to the state it was on the previous day, the software will be uninstalled, and you won't be able to use it.

What you need to know

- If you restore to a restore point and then change your mind, you can undo the restoration.
- You should create system restore points:
  - Before you add or change software or hardware
  - Periodically, whenever the computer is running normally
- System Restore also saves shadow copies of files that have been changed since the last restore point was created. For more information about using shadow copies to restore, see Help and Support.

Creating a system restore point

1. Select **Start > Control Panel > System and Security > System**.
2. In the left pane, click **System Protection**.
3. Click the **System Protection** tab.
4. Click **Create**, and follow the on-screen instructions.

To restore, see Restoring to a previous system restore point on page 88.

Backing up system and personal information

Your computer stores information that is important to you, such as files, emails, and photos, and you will want to keep that information even if you download a virus or the system stops working properly. How completely you are able to recover your files depends on how recent your backup is. As you add new software and data files, you should create backups on a regular basis.

Tips for a successful backup

- Number backup discs before inserting them into the optical drive.
- Store personal files in the Documents, Music, Pictures, and Videos libraries, and back up these folders periodically.
- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to re-enter your preferences.

To create a screen shot:

1. Display the screen you want to save.
2. Copy the screen image:

   To copy only the active window, press alt+prt sc.

   To copy the entire screen, press prt sc.
3. Open a word-processing document or graphics editing program, and then select **Edit > Paste**. The screen image is added to the document.
4. Save and print the document.

What you need to know

- You can back up your information to an optional external hard drive, a flash drive, a network drive, or discs.
- Connect the computer to AC power during backups.
- Allow enough time for the backup. Depending on files sizes, it may take more than an hour.
- Verify the amount of free space on your backup storage device before you back up.
- You should back up:
  - Before adding or changing software or hardware.
  - Before the computer is repaired or restored.
  - On a regular schedule to be sure you have recent copies of personal information.
  - After you add many files—for example, if you saved videos from a birthday party.
  - Before using antivirus software to remove a malicious program.
  - After adding information that is hard to replace, such as pictures, videos, music, project files, or data records.

Creating a backup using Windows Backup and Restore

Windows allows you to back up files using Windows Backup and Restore. You can select the level you want to back up, from individual folders to drives. The backups are compressed to save space. To back up:

1. Select **Start > Control Panel > System and Security > Backup and Restore**.
2. Follow the on-screen instructions to schedule and create a backup.

NOTE: Windows includes the User Account Control feature to improve the security of the computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. See Help and Support for more information.

To restore, see Restoring specific files using Windows Backup and Restore on page 88.

Restore and recovery

Restoring to a previous system restore point

Sometimes installing a software program causes your computer or Windows to behave unpredictably. Usually uninstalling the software fixes the problems. If uninstalling does not fix the problems, you can restore the computer to a previous system restore point (created at an earlier date and time).

To restore to a previous system restore point, when the computer was running correctly:

1. Select **Start > Control Panel > System and Security > System**.
2. In the left pane, click **System Protection**.
3. Click the **System Protection** tab.
4. Click **System Restore**, and follow the on-screen instructions.

Restoring specific files

If files are accidentally deleted from the hard disk and they can no longer be restored from the Recycle Bin, or if files become corrupt, restoring specific files is useful. Restoring specific files is also useful if you ever choose to recover the original system using HP Recovery Manager. You can only restore specific files that you have backed up before.

Restoring specific files using Windows Backup and Restore

Windows allows you to restore files that were backed up using Windows Backup and Restore:

1. Select **Start > Control Panel > System and Security > Backup and Restore**.
2. Follow the on-screen instructions to restore your backup.

NOTE: Windows includes the User Account Control feature to improve the security of the computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. See Help and Support for more information.

Recovering the original system using HP Recovery Manager

HP Recovery Manager software allows you to repair or recover the computer to its original factory state.

What you need to know

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the disc provided by the manufacturer.
- A system recovery should be used as a final attempt to correct computer issues. If you have not already tried restore points (see Restoring to a previous system restore point on page 88) and partial restores (see Restoring specific files on page 88), try them before using HP Recovery Manager to recover your system.
- A system recovery must be performed if the computer hard drive fails or if all attempts to correct any functional computer issues fail.

- If the recovery media do not work, you can obtain recovery discs for your system from the HP website.
- The Minimized Image Recovery option is recommended for advanced users only. All hardware-related drivers and software are re-installed, but other software applications are not. Do not interrupt the process until it is complete, otherwise the recovery will fail.

Recovering using HP Recovery partition (select models only)

The HP Recovery partition (select models only), allows you to restore your system without the need for recovery discs or a recovery flash drive. This type of recovery can only be used if the hard drive is still working.

To check for the presence of a recovery partition, select **Start**, right-click **Computer** then select **Manage > Disk Management**. If the recovery partition is present, a Recovery drive is listed in the window.

NOTE: Recovery discs have been included if your computer did not ship with a recovery partition.

1. Access HP Recovery Manager in either of the following ways:
   - Select **Start** and type `recovery` in the search field. Select **Recovery Manager** from the list.

     – or –

   - Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen. Then press f11 while the “F11 (System Recovery)” message is displayed on the screen.
2. Click **System Recovery** in the **HP Recovery Manager** window.
3. Follow the on-screen instructions.

Recovering using the recovery media

1. If possible, back up all personal files.
2. Insert the first recovery disc into the optical drive on your computer or an optional external optical drive, and then restart the computer.

   – or –

   Insert the recovery flash drive into a USB port on your computer, and then restart the computer.

   NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 89.
3. Press f9 at system bootup.
4. Select the optical drive or the flash drive.
5. Follow the on-screen instructions.

Changing the computer boot order

To change the boot order for recovery discs:

1. Restart the computer.
2. Press esc while the computer is restarting, and then press f9 for boot options.
3. Select **Internal CD/DVD ROM Drive** from the boot options window.

To change the boot order for a recovery flash drive:

1. Insert the flash drive into a USB port.
2. Restart the computer.
3. Press esc while the computer is restarting, and then press f9 for boot options.
4. Select the flash drive from the boot options window.

12 Specifications

Computer specifications

	Metric	U.S.
Dimensions (touch models)		
Depth	**261.1 mm**	10.28 in
Width	**384.5 mm**	15.14 in
Height (rear)	**25.15 mm**	0.99 in
Weight Touch Non-touch	 **2.499 kg** **2.299 kg**	 5.51 lb 5.07 lb
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 W 19.5 V dc @ 2.31 A – 45 W	
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.

39.6-cm (15.6-in) display specifications

	Metric	U.S.
Active diagonal size	39.6-cm	15.6-in
Thickness	3.8 mm or 3.2 mm	0.150 inch or 0.126 inch
Resolution	1920x1080 (FHD) 1366x768 (HD)	
Surface treatment	AntiGlare or BrightView	
Contrast ratio	300:1 (typical)	
Brightness	220 nits (typical)	
Viewing angle	SVA	
Backlight	WLED	
Companion standard	eDP	

Hard drive specifications

	2-TB*	1-TB*	750-GB*	500-GB*
Dimensions				
Height	9.5 mm	9.5 mm	9.5 mm	7.0 mm or 9.5 mm
Length	100.4 mm	100.4 mm	100.4 mm	100.6 mm
Width	69.9 mm	69.9 mm	69.9 mm	70.1 mm
Weight	115.0 g	115.0 g	115.0 g	92.0 g
Interface type	SATA	SATA	SATA	SATA
Transfer rate				
Synchronous (maximum)	300 MB/sec	300 MB/sec	300 MB/sec	300 MB/sec
Security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)				
Single track	1.4 ms	1.4 ms	1.5 ms	3 ms
Average (read/write)	10 ms	10 ms	11 ms	13 ms
Maximum	12 ms	12 ms	14 ms	24 ms
Logical blocks	3,877,842,922	1,938,921,461	1,465,149,168	1,048,576,000
Disk rotational speed	5400 rpm	5400 rpm	5400 rpm	5400 rpm
Operating temperature	**0°C** to **60°C** (32°F to 140°F)			
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.				
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.				

Blu-ray ROM DVD±RW SuperMulti DL Drive

Applicable disc	**Read:**	**Write:**	
	CD-DA, CD+(E)G, CD-MIDI, CDTEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVDROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD +RW, DVD-RAM, HD-ROM (Single Layer), HD-ROM (Dual Layer), HD DVD-R, HD DVD-R for Dual Layer, HD DVD-RW	CD-R and CD-RW DVD+R, DVD+R(9), DVD +RW, DVD-R, DVD-R(9),DVD-RW, DVD-RAM	
Access time	**CD**	**DVD**	**HD**
Random	170 ms	170 ms	230 ms
Cache buffer	8 MB		
Data transfer rate			
24X CD-ROM	3,600 KB/sec		
8X DVD	10,800 KB/sec		
24X CD-R	3,600 KB/sec		
16X CD-RW	2,400 KB/sec		
8X DVD+R	10,800 KB/sec		
4X DVD+RW	5,400 KB/sec		
8X DVD-R	10,800 KB/sec		
4X DVD-RW	5,400 KB/sec		
2.4X DVD+R(9)	2,700 KB/sec		
5X DVD-RAM	6,750 KB/sec		
1X BD-ROM	4,500 KB/sec		
1X BD-R read	4,500 KB/sec		
1X BD-RE read	4,500 KB/sec		
Transfer mode	Multiword DMA Mode		

DVD±RW SuperMulti DL Drive specifications

Applicable disc	**Read:** CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	**Write:** CD-R and CD-RW DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 µm	
Access time	**CD**	**DVD**
Random	< 175 ms	< 230 ms
Full stroke	< 285 ms	< 335 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	2 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD-ROM	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
Transfer mode	Multiword DMA Mode	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

13 Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 volts ac, or from 220 to 240 volts ac.

The 3-conductor power cord set included with the computer meets the requirements for use in the country or region where the equipment is purchased.

Power cord sets for use in other countries and regions must meet the requirements of the country or region where the computer is used.

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.5 m** (5.0 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	ISI	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 3-conductor, 0.75mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

Country/region	Accredited agency	Applicable note number

2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.
3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75mm^2 or 1.25mm^2 conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
5. The flexible cord must be Type H05VV-F 3X0.75mm^2 conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.
6. The flexible cord must be Type HVCTF 3X1.25mm^2 conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
7. For 127 V ac, the flexible cord must be Type SVT or SJT 3 x 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3X0.75/1.00mm^2 conductor size, with plug BS 1363/A with BSI or ASTA marks.

14 Recycling

When a non-rechargeable or rechargeable battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for battery disposal.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, see the HP Web site at http://www.hp.com/recycle.

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